

Sachdokumentation:

Signatur: DS 4186

Permalink: www.sachdokumentation.ch/bestand/ds/4186

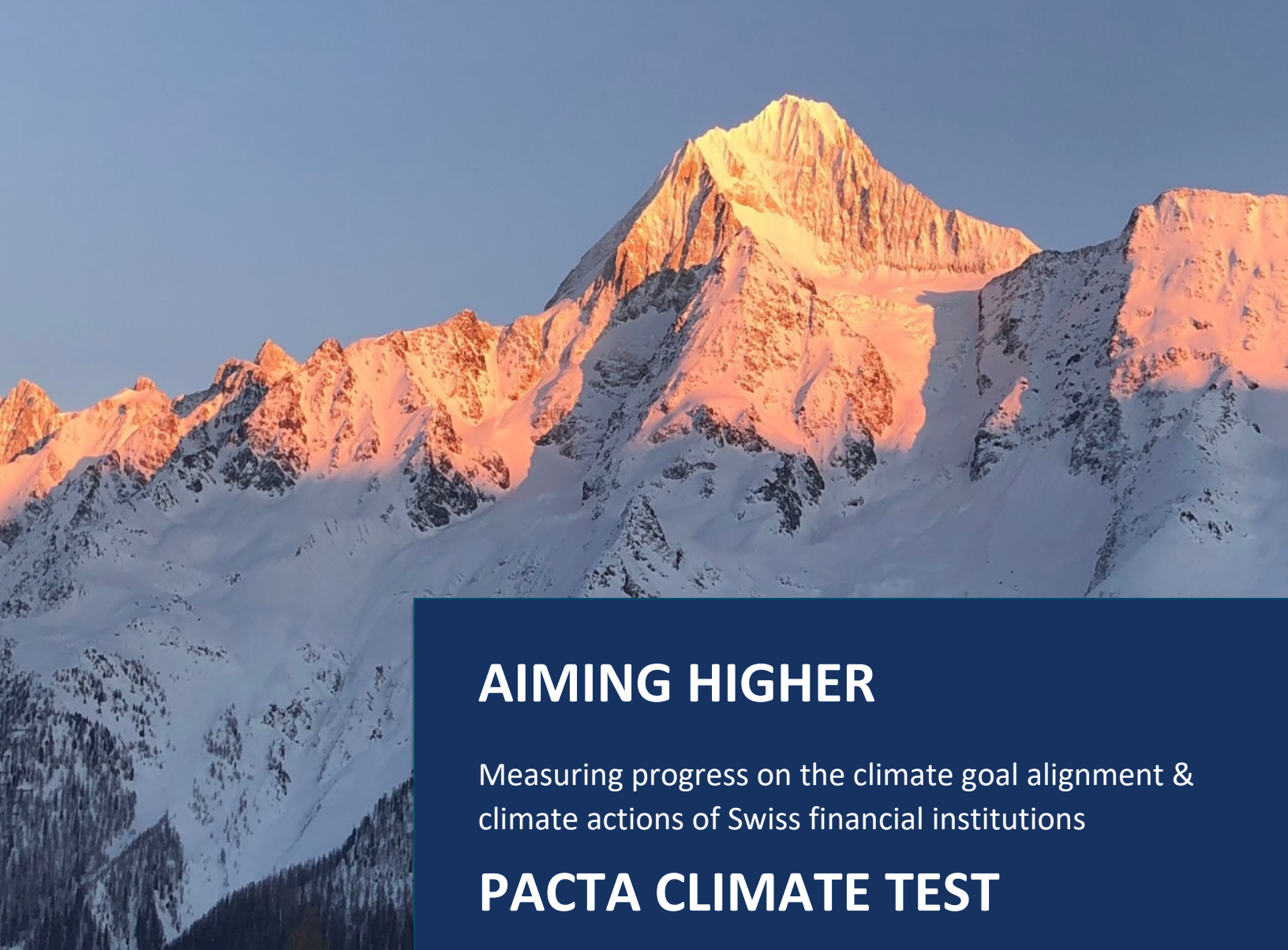


Nutzungsbestimmungen

Dieses elektronische Dokument wird vom Schweizerischen Sozialarchiv zur Verfügung gestellt. Es kann in der angebotenen Form für den Eigengebrauch reproduziert und genutzt werden (private Verwendung, inkl. Lehre und Forschung). Für das Einhalten der urheberrechtlichen Bestimmungen ist der/die Nutzer/in verantwortlich. Jede Verwendung muss mit einem Quellennachweis versehen sein.

Zitierweise für graue Literatur

Elektronische Broschüren und Flugschriften (DS) aus den Dossiers der Sachdokumentation des Sozialarchivs werden gemäss den üblichen Zitierrichtlinien für wissenschaftliche Literatur wenn möglich einzeln zitiert. Es ist jedoch sinnvoll, die verwendeten thematischen Dossiers ebenfalls zu zitieren. Anzugeben sind demnach die Signatur des einzelnen Dokuments sowie das zugehörige Dossier.



AIMING HIGHER

Measuring progress on the climate goal alignment & climate actions of Swiss financial institutions

PACTA CLIMATE TEST SWITZERLAND

November 2022

Published by Paris Agreement Capital Transition Assessment (PACTA), Federal Office for the Environment of Switzerland (FOEN), and Wüest Partner

For inquiries, please contact pactacop@rmi.org
 Website: www.transitionmonitor.com/pacta-ch-2022

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 investors 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 or groups of governments and supervisors to help them apply PACTA to the portfolios of their regulated entities.

About Wüest Partner: Wüest Partner is an independent, owner-managed consulting firm. As impartial experts, we have been delivering first-class decision-support tools for professional real estate players since 1985. We offer our clients – both in Switzerland and abroad – a wide range of services encompassing advice, valuations, data, applications, publications, and education. Our knowledge creates transparency and helps to break new ground for the continued development of the real estate sector.

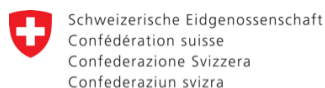
Authors: Catarina Braga (PACTA, Lead Author), Tilman Trompke (PACTA), Nicholas Dodd (PACTA), Maarten Vleeschhouwer (PACTA), Reto Frey (Wüest Partner AG)

Contributing Authors: Antoine Lalechere (PACTA), Faria Khandaker (PACTA), Monika Furdyna (PACTA), Jacob Kastl (PACTA), Daisy Pacheco (PACTA), George Harris (PACTA), Nayra Herrera (PACTA), Alex Axthelm (PACTA), CJ Yetman (PACTA), Sarah Mendelsohn (PACTA), Ronny Haase (Wüest Partner AG, Partner), Thomas Wider (Wüest Partner AG, Manager), Marius Zumwald (Wüest Partner AG, Senior Consultant)

Support: Silvia Ruprecht (FOEN, project lead), Raphael Bucher (FOEN), Gabriela Blatter (FOEN), Ines Barnetta/Xenia Karametaxas (SIF), Yuliya Blondiau (SFOE)

Funder: This project has received funds from the Swiss Federal Office for the Environment for the enhancement of the methodology and its application in Switzerland.

Supported by:



Swiss Confederation

Federal Office for the Environment FOEN

Disclaimer: This report reflects only the authors' views. The Swiss Federal Office for the Environment FOEN is not responsible for any use that may be made of the information it contains.

Table of Contents

Table of Contents	3
1. Introduction	5
2. From scenario analysis to making an impact	9
2.1. The use of scenario analysis to assess transition risks and measure portfolio alignment.....	9
2.2. The rise of climate strategies and green financial products: missing link to impact?	11
2.3. Strategies to achieve impact in the real economy	14
2.4. The role of PACTA: tracking changes on the portfolio level.....	15
3. Participation and Coverage of the Analysis	17
3.1. Climate scenario analysis of listed equity and corporate bonds portfolios.....	17
3.2. Participation in the analysis of real estate and mortgage portfolios	22
4. Exposure and Alignment Results	25
4.1. Climate alignment of listed equities and corporate bonds portfolio	26
4.1.1. Fossil fuels: oil & gas extraction and coal mining	26
4.1.2. Power	33
4.1.3. Automotive	38
4.1.4. Aviation.....	41
4.1.5. Steel.....	43
4.1.6. Cement	46
4.2. Climate evaluation of Swiss real estate and mortgage portfolios	47
4.2.1. How the benchmark for 'climate compatibility' is defined	48
4.2.2. CO ₂ emissions of the Swiss building stock.....	48
4.2.3. Overall results.....	49
4.2.4. Forward-looking results based on the planned renovations of buildings.....	51
4.2.5. Results by energy source	55
5. Aiming higher: climate action survey results across all asset classes	57
5.1. Overall climate strategies and goals	58
5.2. Engagement with investee companies	61
5.2.1. Investee Engagement: background and evidence for impact	61
5.2.2. Surveying engagement practices in Switzerland.....	63
5.2.2.1. Investee and issuer engagement per asset class.....	64
5.2.2.2. Investee and issuer engagement per sector (listed equities).....	66
5.2.2.3. Joint engagement with other financial institutions (listed equities)	68
5.2.2.4. Combining engagement with exclusions	69
5.2.2.5. Internal resources dedicated to engagement.....	70
5.3. Cross-referencing climate goals and climate action	72
5.3.1. Relating climate goals to active ownership.....	72

5.4. Political engagement	73
5.4.1. Positioning on national political issues	74
6. Climate action in real estate: survey analysis for mortgages.....	76
6.1. Incentives to encourage mortgage borrowers to make climate-friendly refurbishments	76
6.2. Climate-relevant measures to incentivize mortgage borrowers to refurbish their buildings in a climate-friendly way	79
7. Conclusion and next steps.....	83
Bibliography.....	87
Annex I: the PACTA Methodology	89
General considerations	89
Coverage.....	89
Asset classes covered	89
Sectors covered.....	90
Data inputs	90
Portfolio data	90
Financial data.....	91
Physical Asset-Based Company Data (ABCD)	91
Scenario data.....	91
PACTA metrics.....	94
Exposure: Technology share mix	95
Alignment: production volume trajectory and emission intensities	96
Production of Volume Trajectory.....	96
Emission intensities	98
Qualitative survey.....	98
Annex II: Scenarios – what are climate-related scenarios and decarbonization pathways?	99
Understanding scenarios and their sectoral pathways	99
Limitations and assumptions of the scenarios used in the Climate Test 2022	103
Probability of achieving the stated climate outcomes	103
The assumptions and judgments related to technological maturity	104
The role of different technologies in each scenario.....	104
Summary descriptions of the scenarios used in the 2022 climate test.....	105
International Energy Agency (IEA), WEO 2021 and ETP 2020.....	105
European Commission Joint Research Centre (JRC), GECO 2021	107
Institute for Sustainable Futures, Net Zero scenario	108

1. Introduction

By signing the Paris Agreement Switzerland has committed itself to gear its financial flows toward the goal of limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. The Swiss parliament also wants to anchor this goal in national climate legislation¹. In 2020 the federal council set the goal that Switzerland should be leading in sustainable finance.

To monitor the progress of the entire financial markets' climate goal alignment, the Federal Office for the Environment (FOEN) in close collaboration with the State Secretariat for International Finance (SIF) runs regular PACTA climate tests. The 2022 Swiss Climate Test consists of a quantitative module for global equity and corporate bond investments and one for Swiss real estate and mortgages. It also includes a qualitative survey to give a more holistic overview of climate action being taken by the Swiss financial sector.

The PACTA Climate Test can help financial institutions meet their different reporting requirements. At the financial institution level, Switzerland will introduce a reporting obligation for large companies and financial market actors reflecting the TCFD guidelines². Associations also recommend such reporting for smaller financial institutions and investors³. In addition, the Swiss Federal Council is encouraging the financial sector to join net zero alliances; mainly the Glasgow Financial Alliance for Net Zero (GFANZ)⁴ or national alliances⁵ to set ambitious climate goals and undertake effective action. The participants in the Climate Test 2022 receive individual, interactive reports with their climate goal alignment results as well as an executive summary for each portfolio in English, German, and French. These reports can support the different reporting requirements. The individual reports give insights into financial institutions' climate goal alignment and allow for peer comparison through the comparable methodology and data used. They aim to complement and track financial institutions' climate strategies to net zero and support further action as well as the implementation of (self-)regulation and recommendations.

The 2022 test builds upon two successful earlier rounds of tests. The first test that took place in 2017 delivered comparable results for financial institutions and demonstrably triggered action: over 50% of the participants who took the feedback survey said that they had taken climate action based on the results of the 2017 test. In 2020, 171 financial institutions voluntarily signed up for the test which included a newly designed dedicated platform (the Transition Monitor Platform) and interactive reports, which gave users more flexibility in visualizing their results. However, according to the survey data collected in 2022, only 15% of respondents found the 2020 results helpful to define their climate targets or make them more ambitious, and 20% to better measure their climate-related risks. In this round, the PACTA team aimed to make results more helpful through more guidance:

¹ 1.501 | [Indirekter Gegenentwurf zur Gletscher-Initiative. Netto-Null-Treibhausgasemissionen bis 2050 | Geschäft | Das Schweizer Parlament](#)

² [Federal Council initiates consultation on ordinance on climate reporting by large companies](#)

³ [ASIP - ESG Wegleitung; Net zero alliances: an essential tool for supporting climate goals- SwissBanking; AMAS joins net zero alliance](#)

⁴ [Glasgow Financial Alliance for Net Zero](#)

⁵ See also [Exemplary Energy and Climate Initiative](#)

- through multiple webinars and continuous user support, users had the opportunity to raise questions and receive guidance throughout the project.
- more actionability: This year's analysis puts a significantly larger focus on the survey section, including detailed guidance on best practices for setting climate strategies and engaging with investee companies. more engagement with users and user-centric design: not only through individual user support, but also through exchange with several associations, the PACTA team collected useful feedback to improve the comprehensiveness of the analysis.

The new PACTA Executive Summary made available for participants of the test also contains most of the Swiss Climate Scores. It can be published on a voluntary basis by financial institutions. In addition, FOEN supports a comparable database for funds for retail clients by adding Swiss Climate Score indicators based on the PACTA methodology (release planned by the end of 2022, see www.myfairmoney.com).

Our work for the next rounds in Switzerland and beyond is to help financial institutions to act based on their PACTA results and to allow easier comparison of the progress of results year on year. The PACTA team recognizes that there is still a long way to make the methodology and its outputs better fit for the purpose of climate action. Improvements to the company-level information that can be provided are in the making and further changes in the interactive report are scheduled. Most importantly, the team is working on making the tool available offline to investors to allow them to integrate the analytics in-house. For now, the PACTA team is focused on engaging directly with financial institutions in order to help show them how to take action on their PACTA results.

The present test forms part of the PACTA Coordinated Projects program – which already reached close to 20 governments and financial supervisors around the globe, contributing to the standardization of the measurement and monitoring of the financial sector's contribution to the Paris climate goals. PACTA Coordinated Projects (PACTA COP) builds on the Swiss-Dutch initiative launched in 2019 on the margins of the UN Climate Summit to measure and align financial flows with the Paris Agreement's 1.5°C goals. Beyond Switzerland, PACTA COP already took place in Liechtenstein, Austria, Luxembourg, and Norway, on the country level. On the supervisory level, PACTA tests took place, for example, with the New York Department of Financial Services, the Swedish Financial Supervisor, and the Colombian Financial Supervisor, among others. Lessons learned will be shared and fed into the international debate on measuring climate alignment and monitoring progress toward it. With applications in South and North America, Europe, and Asia, PACTA is developing into an international standard.

In total 133 financial institutions submitted listed equities, corporate bonds, real estate, and mortgage portfolios for analysis in the 2022 PACTA Climate Test Switzerland. These include 13 asset managers, 31 banks, 20 insurance companies, 67 pension funds, and 2 financial institutions classified as other. Even though the total number of participants decreased when compared to the 2020 round of the test (from 179 in 2020 to 133 in 2022), statistics show only a small decrease in the total portfolios submitted to analysis for listed equities and corporate bonds.

The main PACTA results for listed equities and corporate bonds show that Swiss financial institutions reduced their exposure to high-carbon technologies (i.e., oil & gas) while increasing exposure to low-carbon technologies. All groups reduced their exposure to fossil fuels when compared to 2020 results – mainly banks who had a meaningful reduction in their exposure to oil. At the same time, all groups increased their exposure to renewables and electric vehicles in both their listed equities and corporate bonds portfolios. However, when comparing PACTA results with the climate strategies applied it is possible to see some evidence that the decrease in exposure to fossil fuel is due to exclusion policies – which have a limited capacity to reduce emissions in the real world.

In terms of forward-looking net zero alignment of the production plans of the companies in the portfolios, Swiss financial institutions are mostly misaligned in high-carbon technologies with mixed results for alignment in low-carbon technologies. For example, insurance investee companies are set to increase oil production by almost 4 times in the next five years, and pension funds invested companies are set to increase almost 2 times. Moreover, all peer groups perform worse than the market benchmark in terms of alignment in oil and gas. Similarly, all groups are also misaligned in renewables power generation in corporate bonds portfolios, meaning the build out rate of renewables by investee companies is too slow. Here too, they perform worse than the market benchmark – which is also misaligned itself. In renewables investments in listed equities and electric vehicles all groups appear aligned in the next five years.

The analysis of climate actions and strategies reveals that while a small number of some Swiss financial institutions are already following best practices for credible climate strategies and engagement, there is still scope for a large proportion of institutions to either start acting or improve the effectiveness of their climate actions. Little more than half of all survey respondents (45 out of 85) set concrete climate goals as part of their climate strategy. Of those with concrete climate goals, 86% are backing up their commitments by exercising voting rights in at least one asset class, and 76% engage with investee companies in at least one sector. In regard to “best practices” for engagement, 24 (53%) exercise joint engagement on the sector level and 20 (44%) have an exclusion policy as an escalation strategy in place in case engagement actions turn out to be not successful, and 16 (36%) do not have a dedicated engagement team. These results amplify that, for a significant share of Swiss financial institutions, more efforts are required to fulfill the climate targets that Switzerland committed to in the Paris Agreement.

Switzerland has been on the vanguard of the sustainable finance policy and its financial sector is crucial for the transition due to its relevance in assets under management. While the already applied best practices are welcome, it is time to *aim higher* and look for ways to reduce emissions in the real economy – not only in portfolios. The underlying climate performance of portfolios can only ever improve in two simple ways: either through divesting from polluting companies and investing in greener companies or through the investee companies themselves becoming greener. As a 1.5°C future is already likely off the table due to the lack of action, action from governments and the financial sector is imperative to the transition. Active engagement with invested companies and credible and ambitious climate goals are now the next step beyond exclusion.

The report is structured as follows: after this introduction, we explain how climate scenario analysis can assist financial institutions on implement more climate-related strategies in their investment decisions. Section 3 briefly describes the participation and coverage of the study. Section 4 brings the full analysis of corporate bonds, listed equities, real estate, and mortgages. The section is organized by sector and contains charts on the exposure of the portfolio to the given sector, technology mix allocation of the portfolio, regional exposure of physical assets, forward-looking alignment results, CO₂ intensities for buildings, and forward-looking results based on the planned renovations of buildings. Section 5 explores the qualitative survey results with a focus on engagement. It evaluates overall climate strategies goals and targets, engagement with investee companies and the practices used, cross-referencing of climate goals with climate actions taken, and political engagement at the national level. Section 6 evaluates the climate action-related strategies adopted by financial institutions in real estate and mortgage portfolios. Section 7 presents the conclusions of this study.

2. From scenario analysis to making an impact

2.1. The use of scenario analysis to assess transition risks and measure portfolio alignment

The use of scenario analysis in the financial sector is relatively new. In 2017 the Task Force on Climate-Related Disclosures (TCFD) published its landmark report on the management of climate risks, giving a central role to scenario analysis as a tool to analyze on a forward-looking basis physical and transition-related future risks to the financial system, financial institutions, and their investee companies.

The concept of measuring the ‘alignment’ of investment portfolios with climate objectives was first coined as a concept by 2° Investing Initiative following the Paris summit of 2015 at which the landmark agreement on climate change was signed. Article 2.1(c) of the resulting Paris Agreement included the stated aim of

“Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.”
(United Nations Climate Change, 2015)

The focus on scenario analysis has since led to a wide range of initiatives targeted at and involving the financial sector, with the intention of measuring the alignment of portfolios with climate scenarios and their trajectories. These range from target-setting initiatives - such as the Science-based Target Initiative (SBTi) and the Net Zero Asset Owners Alliance (NZAOA) – to the development of scenario tools and guidance for the sector – such as by the Network for Greening of the Financial System (NGFS) and the Inevitable Policy Response (IPR) as supported by the UN PRI.

The term portfolio alignment has subsequently come to have a range of possible meanings as corporate commitments to ‘alignment’ with net zero objectives and targets have increased (see the box below). Portfolio alignment has also come into focus as a methodology and tool, following the recommendation in 2021 of the Task Force on Financial Disclosures (TCFD) that financial institutions’ disclosures should include, where appropriate, forward-looking metrics linked to portfolio alignment measurement based on scenario analysis. In support of their recommendations, the Portfolio Alignment Team (PAT), now merged into GFANZ has sought to define what alignment means at the financial portfolio level and to make recommendations on how portfolio alignment measurement can be used and for what purposes.

Box 1: What do we mean by ‘alignment’?

In the context of PACTA and the 2022 Swiss Climate Test, the term alignment is understood to refer to a quantitative comparison, based on forward-looking metrics, of the performance of a company or portfolio of company investments, as expressed in terms of CO₂ emissions intensity or production capacity units, when compared to the performance anticipated by a climate change scenario for a climate critical economic activity.

To understand how this concept can apply to financial portfolios, the TCFD Portfolio Alignment Team (PAT) report of October 2021 provided a further definition of ‘portfolio alignment’ as being:

“...the action of assessing the net zero transition progress of the individual counterparties that make up a given financial portfolio, and determining whether or not, at an aggregate level, that group of counterparties is collectively Paris-aligned.

Achieving and maintaining portfolio alignment is necessary for a financial institution to be compliant with the goals of the Paris Agreement.” (TCFD, Portfolio Alignment Team, 2021)

The work of the TCFD PAT was further developed by GFANZ Workstream 1.4 during 2022, culminating in the publication of new guidance on the 1st November 2022⁶. Whilst the new guidance makes an important contribution to the adoption of alignment measurement by financial institutions, the restricted scope of the methodologies and metrics addressed means that it does not, in the opinion of the PACTA team, support all use cases or internal decision-making processes required to drive a transition towards a low carbon economy.

In order to measure the alignment between financial flows and sectoral decarbonization pathways, a consistent point of reference is needed. This point of reference can be understood as a “climate indicator”. Throughout this meta report, the main climate indicator used is a forward-looking production unit, based on physical asset-based company data.

The production values of companies are then attributed to the financial portfolios holding the securities issued by the respective companies. The required efforts for decarbonization per sector are derived from climate scenarios. These scenarios contain sectoral decarbonization pathways, production targets from which can then be allocated to the companies operating in these sectors. which in turn can be attributed to the portfolios holding the securities.

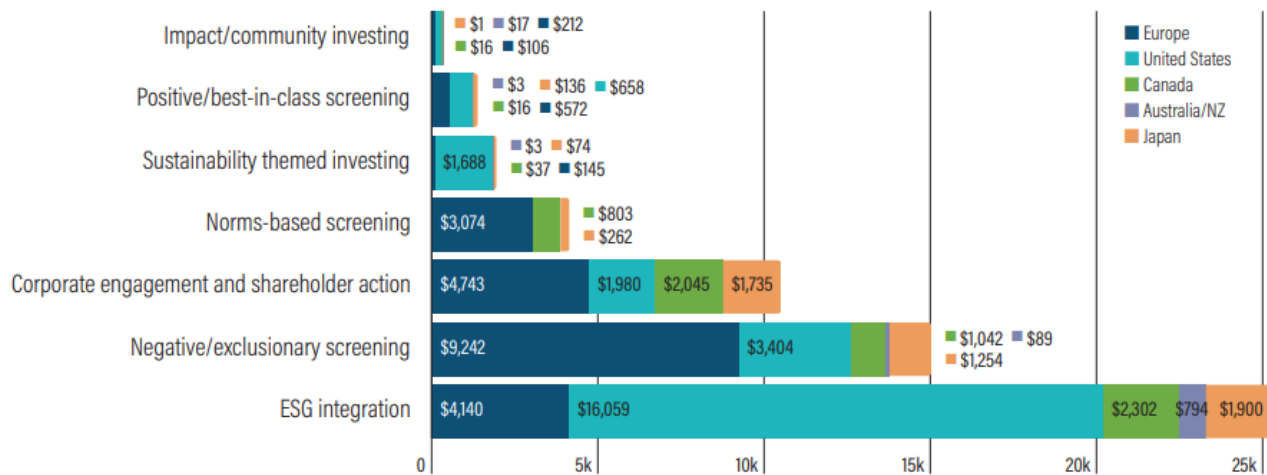
⁶ [Sectoral Pathways for Financial Institutions](#)

2.2. The rise of climate strategies and green financial products: missing link to impact?

In addition to hundreds of financial institutions joining international initiatives to set targets to align their portfolios, we have also seen an exponential rise in the offering of green financial products and sustainable investing strategies. This activity can be seen both at the level of fund design and in the range of metrics offered by ESG providers. Figure 1 provides an overview of assets under management and the geography of best practices in strategies adopted to inform portfolio allocation. It shows that by far the most popular strategy across OECD countries in 2020 was ‘ESG integration’ followed by ‘negative/exclusionary screening’.

The majority of growth and capital allocation into climate-orientated investment is reported as having occurred in Europe and the USA, accounting for over 85% of assets under management. Of these total assets under management, the largest proportion is allocated to ‘clean energy/technology’ funds (31%), followed by ‘climate solutions’ (26%) and ‘low carbon’ (17%).

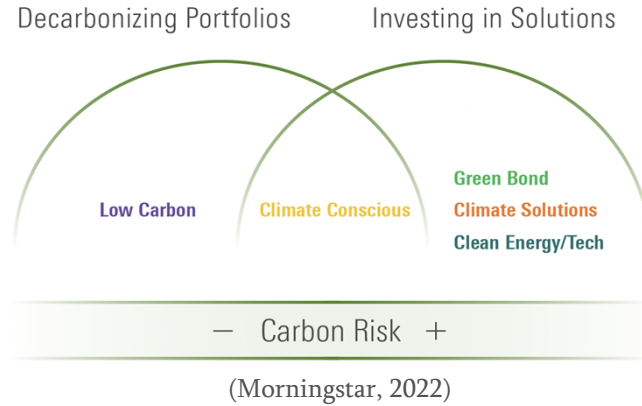
FIGURE 1: SUSTAINABLE INVESTING ASSETS BY STRATEGY AND REGION 2020



(Global Sustainable Investment Alliance, 2021)

Recent market analysis of climate-orientated investment strategies also offers insight into investor practices. Similarly, to sustainability investing, their growth has also been particularly notable from 2020 onwards, reflecting a significant focus on environmental issues prompted by the global Covid-19 pandemic. The market now offers investors a relatively wide range of choices in terms of fund aims & objectives, investment strategies, portfolio allocations, and risk profiles. Morningstar has conducted a comprehensive analysis of climate strategies and their broad categorization of funds in the market is visualized in Figure 2.

FIGURE 2: CLIMATE STRATEGIES OF PRODUCTS IN THE FUND UNIVERSE



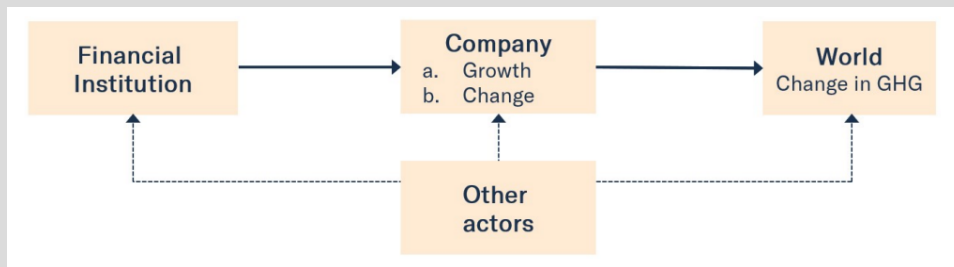
Nonetheless, it is important to recognize that the impact of all these different types of investment strategies on greenhouse gas (GHG) emissions reductions in the real economy is in practice rarely tested (see Box 2 below). Much of the ‘success’ of the strategies is measured by the ability of financial institutions to ‘decarbonize their portfolios’ or ‘align their portfolios with climate goals’ in some form – independent of the extent to which this leads to decarbonization in the economy more generally. Whilst Morningstar provides some analysis of the emissions intensity of each fund in the market and also exposure to climate solutions, there is very limited evidence available on which to evaluate the effectiveness of these different fund types in achieving real economy reductions in CO2 emissions.

Box 2: What do we mean by real economy ‘impact’?

The impact of a financial institution (FI) and its portfolio investment strategies on climate change can be defined, in line with academic literature, as the change that the portfolio manager causes in the activities of real-economy actors (most often companies) and how the change in those activities directly or indirectly reduces GHG emissions. In effect, the causal chain links climate actions, change, and outcomes from that change.

If we apply this definition to climate change, the change can either take the form of growth in a company’s activities (e.g. growth of its green power production) or of a change in the quality of a company’s activities (e.g. an increase in the energy efficiency of a plant), as illustrated by Figure 3. It should be noted that this definition can be applied not only to the positive impacts of the FI on climate change but also to negative impacts. An example could for example be a growth in the activities of a coal extractor enabled by a bank’s loan.

FIGURE 3: ILLUSTRATIVE DEFINITION OF THE FINANCIAL INSTITUTION'S IMPACT ON COMPANIES AND GHG EMISSIONS



(Kölbel, Heeb, Paetzold, & Busch, 2020)

“Impact” thus seeks to capture a causal, demonstrable relationship between a financial institution’s action and a real-world change – in the case of climate change, a change in GHG emissions. Many other factors, beyond the FI’s actions, can affect the activities of companies (e.g. consumer pressure, regulations, etc.). The FI’s impact is the share of the observed change that was caused by the FI’s actions.

Here alignment measurement based on asset-based company data could have a potential role to play in looking through underlying assets and the outcomes of targets, strategies, and investment commitments.

2.3. Strategies to achieve impact in the real economy

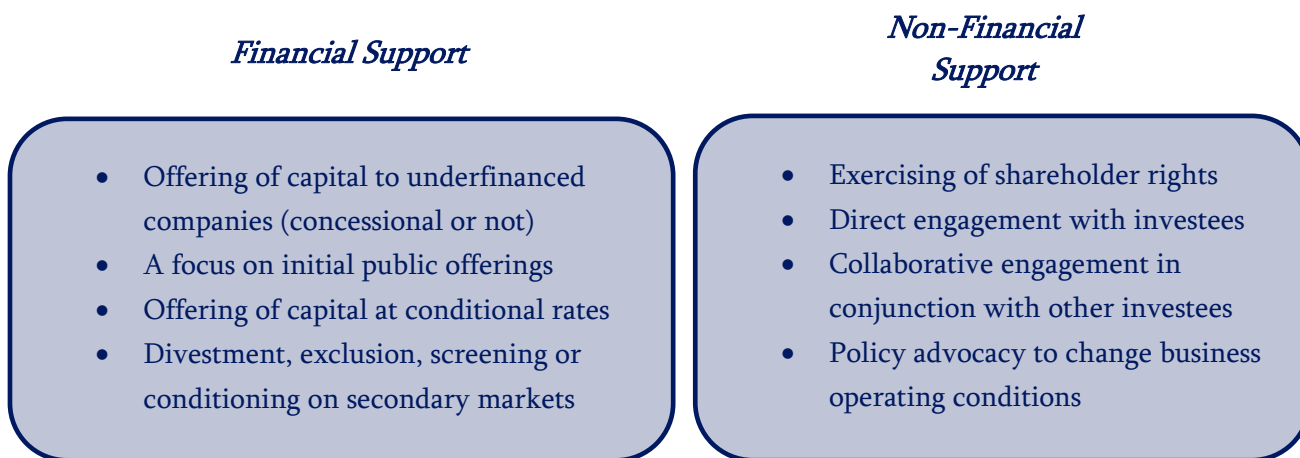
Over the last few years, there has been increasing awareness within the financial community of the need for investment strategies to achieve an impact on the real economy. In practice a financial institution can have an impact on the behavior of its investee companies through two broad mechanisms:

- By providing financial support for the transitioning or growth of a company, or
- By supporting companies to transition or grow by using non-financial levers.

The challenge is to adapt impact mechanisms and related climate actions to each individual financial institution and the asset classes they invest in and/or finance. The mechanisms for maximizing the impact of an investor in listed equity compared to a bank providing credit will be different because the opportunities and constraints are very different. For example, secondary markets for equity do not represent an injection of new capital into companies, so the financial support mechanisms are less relevant.

The figure below provides some examples of climate actions that fall under these two broad impact mechanisms. These have been identified both from literature and knowledge of the market practice. Other distinct actions exist such as holdings in infrastructure and real estate funds that manage illiquid assets, but their selection will be specific to the investment strategy of an institution.

FIGURE 4: EXAMPLE CLIMATE ACTIONS THAT CAN BE UNDERTAKEN BY A FINANCIAL INSTITUTION



According to previous research by the 2° Investing Initiative, actions classified under these two categories don't all have the same level of evidence of effectiveness. Direct engagement with companies, the allocation of conditional capital, and the provision of capital at concessional rates are associated with the most evidence of effectiveness when it comes to impacting the behavior of companies. On the other hand, actions such as divestment, exclusion, or screening on secondary markets are associated with limited evidence

of effectiveness⁷ and more recent studies refer to their effectiveness under specific conditions, for example where divestment is a coordinated action by a large number of institutional investors.

2.4. The role of PACTA: tracking changes on the portfolio level

The tracking asset-level changes methodology described in the recent **Tracking Real World Emissions Reductions** report allows to look into changes in the alignment of portfolios and evaluate if the changes were due to changes in the real economy (i.e., shutdown of coal power plants) or due to portfolio reallocation (i.e., divestment). Using a group of 40 financial institutions in Switzerland that participated in the PACTA Climate Test in 2017 and 2020, the research found a reduction in the exposure of coal-fired power capacity, but the reduction was mainly determined by divestment, suggesting that the assets may have simply been moved to another actor in the financial system with very little impact on emission reduction in the real world.

As we move to a new phase for PACTA we are also scaling-up ambition and looking to incorporate historical track changes into our tool and methodology, which would allow users to spot points for improvement in their portfolios. In the meantime, the Table 1 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 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?
<p>High carbon technologies need to decline in line with the trajectories for each sector.</p> <p><i>Example technologies: coal power generation, oil production, ICE vehicle production</i></p>	<p>Avoidance or exclusion of some types of investments based upon their underlying economic activity, sector or technology.</p> <p>Targeted underweighting of assets from specific sectors, such as from fossil fuels, to reduce exposure and financing provided to high emission fuels and technologies and/or activities that pose transition risks</p>	<p>User can measure the exposure of their portfolios to high-carbon technologies, as presented in their PACTA quantitative results (see section “Current Exposure” in the “Climate Scenario Analysis” chapter).</p> <p>If negative screening is applied it would be expected to see this reflected in lower overall exposures to high-carbon technologies.</p>
<p>The production capacity for low carbon technologies needs to be ramped up significantly.</p> <p><i>Example technologies: renewable power generation, electric vehicles, electric arc furnace steel production</i></p>	<p>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.</p>	<p>Users can measure the exposure and alignment of their portfolios to low-carbon technologies, as presented in their PACTA quantitative results (see section “Future Technology Breakdown” in the “Climate Scenario Analysis” chapter).</p>

⁷ [Can Sustainable Investing Save the World? Reviewing the Mechanisms of Investor Impact](#)

	<p>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).</p>	<p>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.</p>
<p>An overall technology transition from high to low carbon technologies, as well as a reduction in emissions intensities.</p> <p><i>Example sectors: power and automotive (technology transition), steel and cement (emissions intensity reduction)</i></p>	<p>Financial institutions use influence – whether via voting rights, lending decisions or and bilateral engagement – to influence investee companies in order to seek improvements in their climate performance.</p> <p>Financial institutions commit sufficient human resources to engagement in order to target investee companies in the portfolio that need to improve.</p> <p>Financial institutions jointly engage investee companies together with other financial institutions in order to seek improvements in their climate performance.</p>	<p>Users can make use of PACTA quantitative results to identify asset classes, sectors, and technologies where improvement is needed (see section “Alignment of Production Trajectories” in the “Climate Scenario Analysis” chapter).</p> <p>If engagement is effective this can lead to a change in investee climate strategies and commitments, with the potential to improve their forward-looking results.</p>

3. Participation and Coverage of the Analysis

In total 133 financial institutions submitted listed equities, corporate bonds, real estate, and mortgage portfolios for analysis in the 2022 PACTA Climate Test Switzerland. These include 13 asset managers, 31 banks, 20 insurance companies, 67 pension funds, and 2 financial institutions classified as other. Even though the total number of participants decreased when compared to the 2020 round of the test (from 179 in 2020 to 133 in 2022), the change in participation is largely concentrated amongst pension funds (from 106 in 2020 to 67 in 2022). The number of participating institutions in the insurance, asset managers and banks groups remained roughly the same (from 24 respectively 14 and 31 in 2020 to 20, 13 and 31 in 2022, respectively). Most of the participants uploaded listed equities and corporate bonds portfolios as well as Swiss real estate and mortgage portfolios to the test. A minority only participated in one or the other asset class.

TABLE 2: PARTICIPATION OF SWISS FINANCIAL INSTITUTIONS IN THE 2022 PACTA CLIMATE TEST BY ASSET CLASS AND SURVEY RESPONSE

Group	Listed Equity & Corporate Bonds	Real Estate & Mortgages	Qualitative survey ⁸	Total
Asset Managers	13	14	9	13
Banks	30	21	24	31
Insurance	18	10	12	20
Pension Funds	59	53	38	67
Other	2	-	2	2
Total	122	98	85	133

3.1. Climate scenario analysis of listed equity and corporate bonds portfolios

In total, 2.3 trillion Swiss Francs (CHF) in holdings was submitted and analyzed in the climate scenario analysis. A total of CHF 1.2 trillion in listed equities and 0.7 trillion in corporate bonds could be analyzed using the PACTA methodology. Whilst the total portfolio value submitted for analysis declined by around 32%⁹ when compared to the 2020 Climate Test, the majority of this change was accounted for by assets that are not currently within the scope of analysis by PACTA (e.g. Sovereign bonds) and in fact, the amount submitted in listed equities and corporate bonds remains around the same¹⁰. It is important to highlight that the peer group classified as “Other” was not accounted for in the analysis due to data quality issues.

⁸ The participants of the qualitative survey are contained in the other two modules, meaning that in order to have the participation confirmed in the qualitative survey financial institutions must have submitted portfolios in at least one module

⁹ CHF 3.4 trillion (USD 3.5 trillion, converted by the exchange rate of 31/12/2019) in assets were submitted and analyzed in the 2020 climate test.

¹⁰ CHF 1.27 trillion (USD 1.31 trillion, converted by the exchange rate of 31/12/2019) in listed equities, and CHF 0.68 trillion (USD 0.71 trillion, converted by the exchange rate of 31/12/2019) in corporate bonds were submitted to analysis

The largest peer group in the analysis is that of the 30 banks, which submitted a total portfolio of CHF 1.3 trillion, from which CHF 0.7 trillion is allocated to listed equities, and CHF 0.3 trillion is allocated to corporate bonds. While it is true that the total value submitted to analysis by banks and pension funds declined when compared to 2020 (around 30% and 60%, respectively), asset managers and insurance companies submitted more of their portfolios to analysis when compared to 2020 – the coverage values increased by 30% and 18%, respectively. It is important to remember that the climate scenario analysis of listed equities and corporate bonds also analyzes funds: a look-through is done using a financial database and each fund's listed equities and corporate bonds are attributed to the portfolios as indirect ownership of assets. Portfolios of funds did show some decline, but this may have occurred because of guidelines issued for participants to attribute the composition of the funds directly to their portfolios, rather than using the look-through.

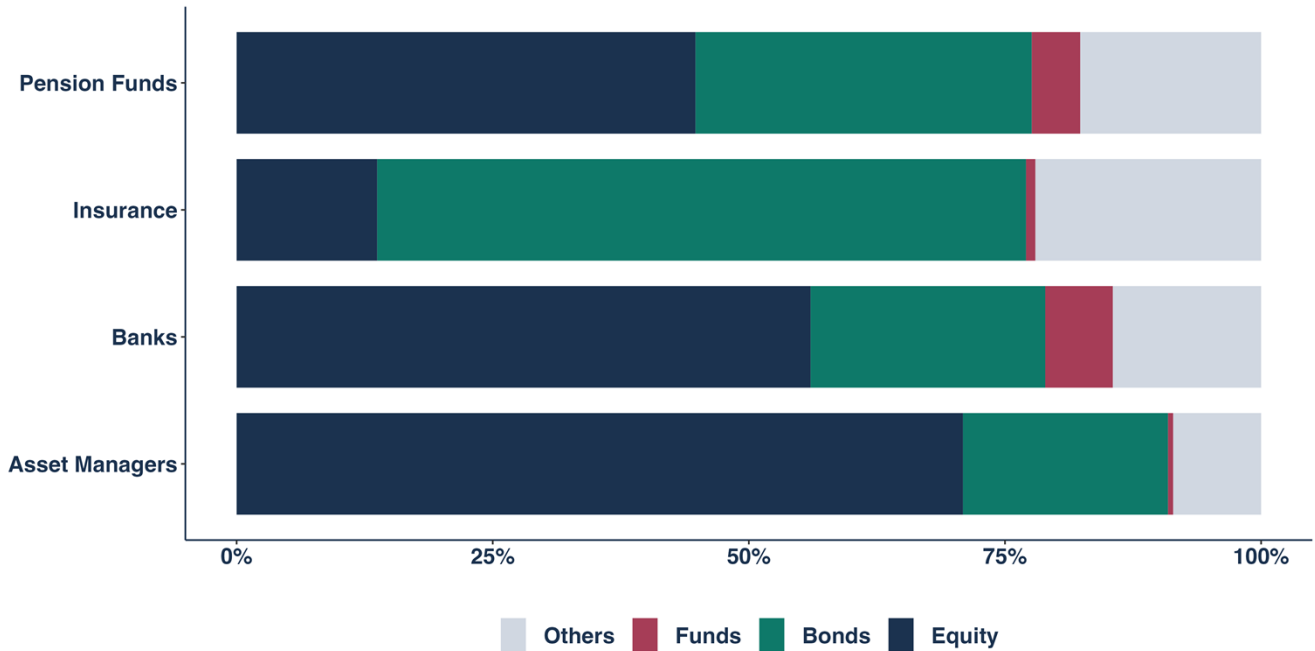
TABLE 3: VALUE OF THE ASSETS UNDER MANAGEMENT SUBMITTED FOR ANALYSIS BY THE CLIMATE TEST

Group	Listed Equity	Corporate Bonds	Funds	Other	Total
Asset Managers	280,0	78,9	2,0	33,6	394,7
Banks	766,5	312,5	90,8	197,1	1 367,0
Insurance	46,9	210,1	4,7	80,3	342,0
Pension Funds	101,1	74,0	10,7	39,7	225,6
Total	1 194,5	675,5	108,2	350,7	2 329,3

Data quality increased substantially in this round of the PACTA Climate Test in Switzerland. An audit function was implemented in the Transition Monitor Platform where users could identify possible mistakes in their portfolios before submitting as well as identify which assets were attributed to which sector and have an upfront vision of the coverage of their portfolios. This new feature increases the confidence in the accuracy of the numbers hereby presented, however, the PACTA Climate Test is voluntary and entirely based on self-reported data the authors have little to no means to check the veracity of the data submitted. Due to the voluntary nature of this study, it is subject to selection bias; participants may have still submitted inaccurate data which was not captured by the audit function or only reported parts of their portfolios instead of the entirety of it, as recommended by the PACTA team.

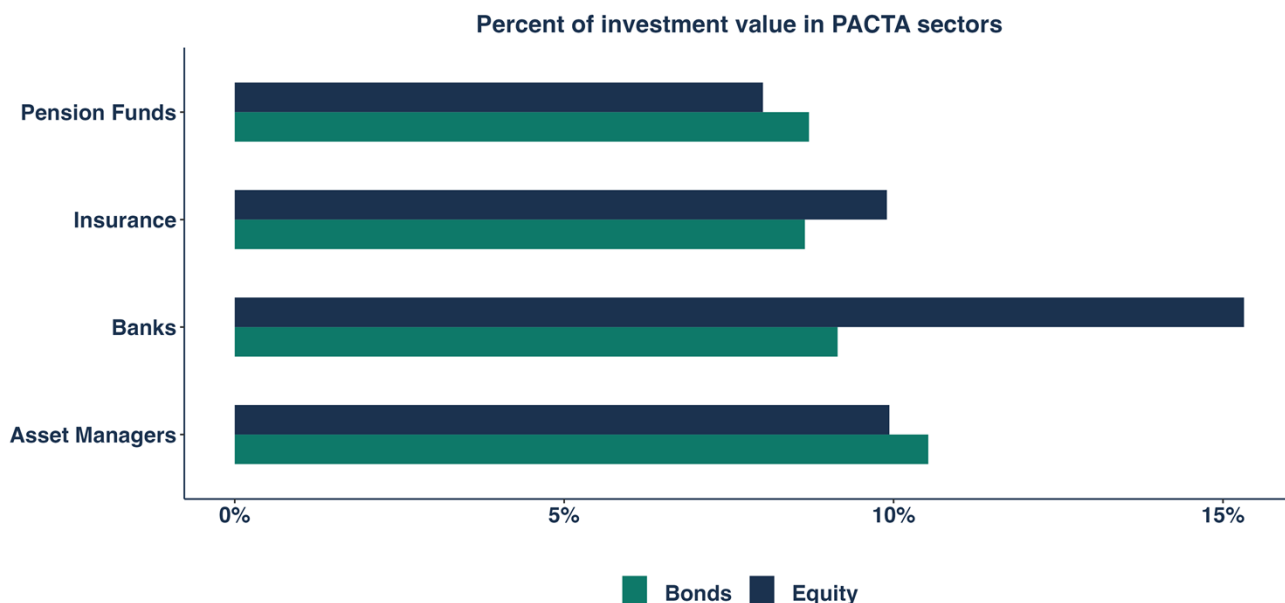
More than 75% of the total value of the portfolios uploaded is allocated to listed equities and corporate bonds. It is important to note that funds are also analyzed as indirect ownership of assets: funds reported are disaggregated on the composition of its assets and, later in the analysis, the assets are attributed to the portfolio as indirect investments. In the chart below we see that corporate bonds, listed equities, and funds cover the majority of the asset value of the total portfolios submitted by the financial institutions in Switzerland.

FIGURE 5: BREAKDOWN OF THE ASSETS UNDER MANAGEMENT SUBMITTED FOR ANALYSIS BY THE FOUR MAIN PEER GROUPS IN THE CLIMATE TEST



The sectors covered by PACTA make up about 10% of the value of all the participating financial institutions’ assets in listed equities and corporate bonds. All peer groups showed exposure to between 8%-15% in listed equity and 8%-10% in corporate bonds. This is unchanged from the share of investments in climate relevant sectors when compared to the 2020 results. An exception is the Banks peer group, which in 2020 had around 10% of their listed equities portfolios in climate-relevant sectors, whereas it now shows an exposure of more than 15% of listed equities allocated in those sectors. When compared to other countries that also ran this analysis, the exposure of Swiss financial institutions to climate-relevant sectors are similar to Austria (8%-17% exposure for both assets), and lower than Liechtenstein (10%-30% exposure for both assets). Norwegian financial institutions, on the other hand, have lower exposure to climate-relevant sectors (7-11% exposure for both assets).

FIGURE 6: PROPORTION OF THE ASSETS UNDER MANAGEMENT IN PACTA SECTORS FOR THE FOUR MAIN PEER GROUPS IN THE CLIMATE TEST



Within the total investment in PACTA sectors, oil & gas extraction and power generation dominate the overall picture. For pension funds, insurance undertakings, and asset managers, these sectors represent more than 50% of total exposure to PACTA sectors in equity portfolios and 75% of the total exposure to PACTA sectors in corporate bonds portfolios. The dominance of these sectors is similar to the results from 2020. One significant difference compared to 2020 is the automotive exposure. While automotive exposures were large in listed equities in 2020 and 2022, the corporate bonds automotive exposure declines significantly from 2020 to 2022, going from roughly 20% across the peers to 5-10%. The picture is different for the banks' peer group, which saw a significant reduction in their exposure to the oil & gas sector (from a share of almost 50% of the total portfolio in 2020 to less than 25% in 2022) while also increasing their exposure to the steel sector in their listed equities portfolio compared to the 2020 results. The decreases in investment in the fossil fuels sector in relation to the banks' total portfolio allocated in climate-relevant sectors may be the result of two different actions, i) a joint effort to exclude such technologies from portfolios, or ii) only parts of portfolios were submitted to the analysis – not its totalities - generating a selection bias in the results.

FIGURE 7: DISTRIBUTION OF THE VALUE OF LISTED EQUITY ACROSS PACTA SECTORS FOR THE FOUR MAIN PEER GROUPS IN THE CLIMATE TEST

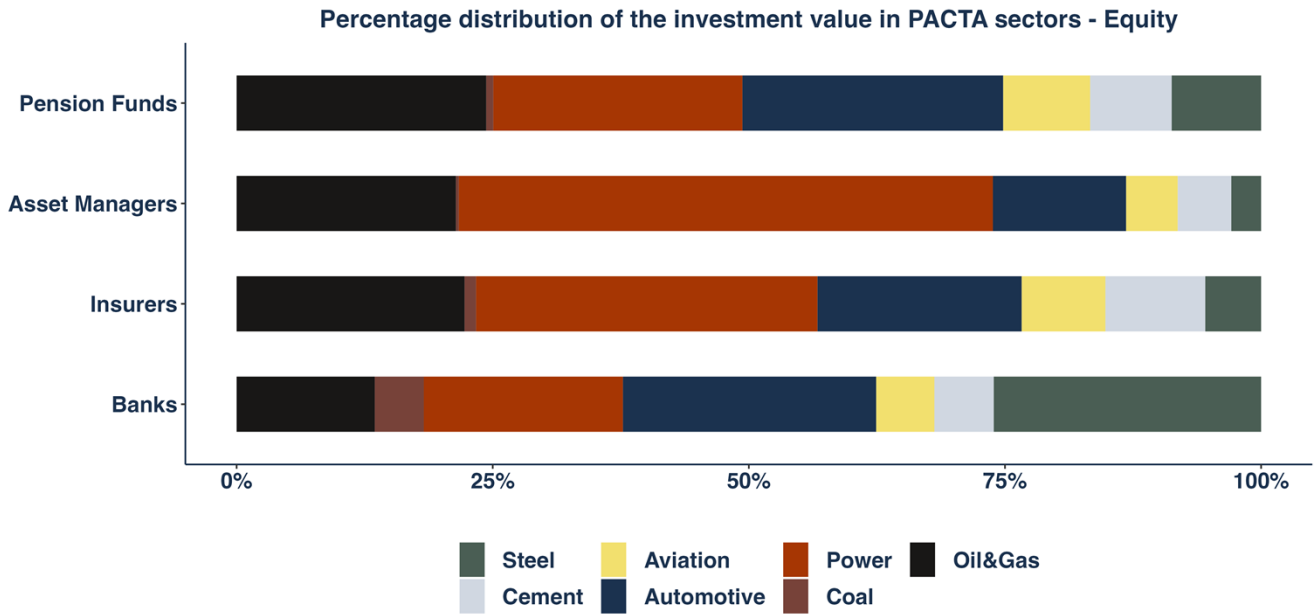
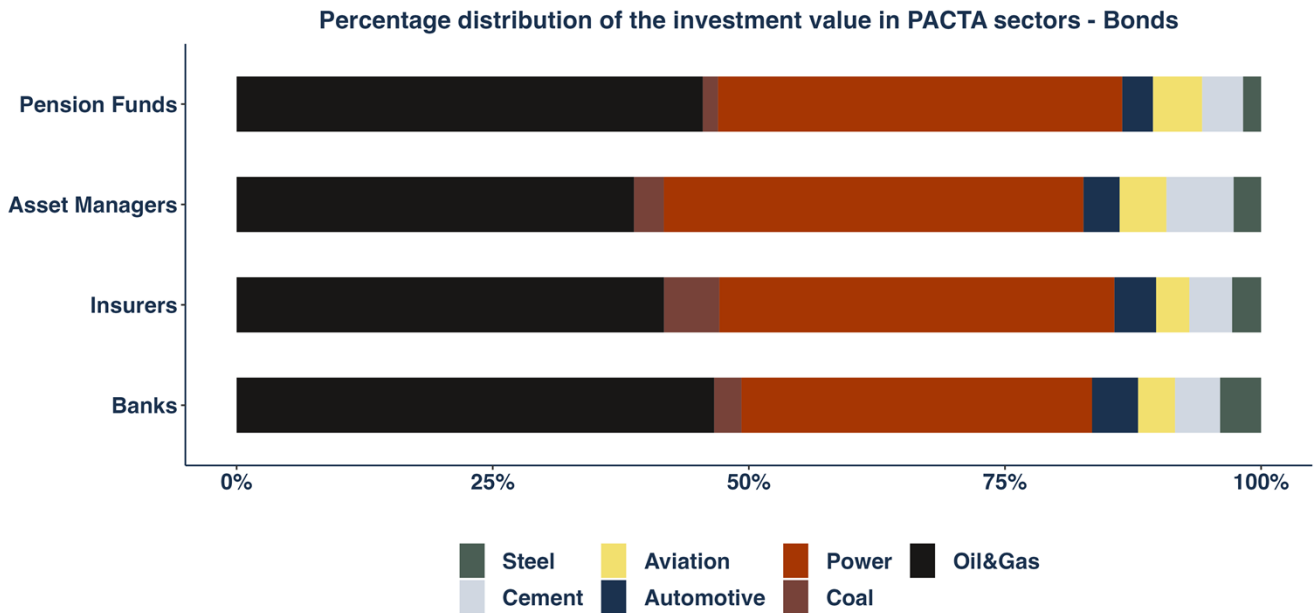


FIGURE 8: DISTRIBUTION OF THE VALUE OF LISTED EQUITY ACROSS PACTA SECTORS FOR THE FOUR MAIN PEER GROUPS IN THE CLIMATE TEST



3.2. Participation in the analysis of real estate and mortgage portfolios

In total 98 financial market players voluntarily submitted 192 real estate and/or mortgage portfolios anonymously and free of charge. Slightly fewer directly held buildings and mortgages were submitted than in the last analysis. However, it can still be assumed that the Swiss real estate portfolio is well covered; in particular, with the mortgages tested, around half of the Swiss residential buildings are included in PACTA 2022. The accuracy of the information on the geographical location of the buildings and mortgages is very high in this year's implementation. The quality of the data has once again increased significantly, especially for directly held buildings. But also, in the case of mortgages, around $\frac{2}{3}$ of the energy reference areas are classified at least in the "medium" category in terms of data quality. This means that quite meaningful analyses of CO₂ emissions are also possible in this segment.

The distribution of the portfolios submitted between the two examined market segments and the four peer groups is shown in the table below.

TABLE 4: DISTRIBUTION OF THE SUBMITTED PORTFOLIOS BY PEER GROUP

Group	# Portfolio direct	[%]	# Portfolio Mortgages	[%]
Asset Managers	41	32%	5	8%
Banks	21	16%	25	40%
Insurance	17	13%	12	19%
Pension Funds	50	39%	21	33%
Total	129	100%	63	100%

In total 21,342 directly held buildings and 905,350 mortgaged properties were submitted for the PACTA 2022 Climate Test analysis. Compared to the 2020 implementation, slightly fewer cases were tested in the categories "directly held buildings" and "mortgages". In comparison, in PACTA 2020 more than 23,000 directly held buildings and around 1,150,000 mortgages were recorded. 96% of all the building cases submitted could be located on the basis of the information on the geographical location. This is a significantly higher proportion than in the last survey.

In order to assess the significance of PACTA 2022 from an energy perspective, the energy reference areas included in the analysis are more important than the pure number of building cases. The distribution by peer group is summarized in Table 5. As expected, banks submitted the largest portfolios in the mortgage segment in terms of the energy reference area EBF. They submitted 94% of the EBF for analysis to PACTA 2022. The floor area submitted for direct holdings increased by 38% compared to 2020, with banks and asset managers showing the greatest increase. The mortgage floor area submitted increased only marginally by 1.8% compared to 2020.

TABLE 5: DISTRIBUTION OF SUBMITTED ENERGY REFERENCE AREAS (EBF) BY PEER GROUP

Group	EBF [m2] direct	[%]	EBF [m2] direct	[%]
Asset Managers	19'081'719	26%	22'222'176	3%
Banks	27'758'123	37%	606'409'054	94%
Insurance	13'834'903	19%	10'965'932	2%
Pension Funds	14'072'753	19%	8'267'024	1%
Total	74'747'498	100%	647'864'186	100%

Residential use again forms the largest share of all building uses in both the segments "directly held buildings" and "mortgages", with values of 87% and 97% respectively. The proportion of single-family houses owned by private individuals is likely to account for a large proportion of building cases in the mortgage segment.

TABLE 6: SHARES OF BUILDING USES FOR DIRECTLY HELD INDIVIDUAL BUILDINGS AND MORTGAGES

Group	Directly held	[%]	Mortgages	[%]
Residential	18517	87.0%	860261	96.6%
Office	2267	10.6%	5917	0.7%
Retail	343	1.6%	4569	0.5%
Industrial	115	0.5%	17539	2.0%
Other	49	0.2%	2255	0.3%

4. Exposure and Alignment Results

The PACTA method is based on forward-looking production and capacity data of the world's industrial activity in the following climate-relevant sectors (hereafter, called PACTA sectors): oil and gas production, coal mining, power generation, automotive manufacturing, aviation, and industry (steel and cement). The main feature of PACTA is its ability to allocate macroeconomic goals (Paris Agreement goals) to microeconomic agents (firms). The model analyses the underlying production assets of company-listed equity and corporate bonds.

In this section, we discuss the results obtained from the analysis of portfolio data reported by Swiss financial institutions. The section analyses the exposures of portfolios to different climate-relevant sectors, and the section presents the forward-looking production trajectory of portfolio holdings in the aforementioned sectors compared primarily to the sectoral decarbonization pathways designed by the International Energy Agency. Results are also compared for pathways with different temperature goals developed by the Joint Research Centre and the Institute for Sustainable Futures. Descriptions of the scenarios that these pathways are taken from can be found in Annex II.

It is important to highlight that the alignment (i.e. the forward-looking assessment) for listed equities and corporate bonds are analyzed using different portfolio attribution methods and therefore a direct comparison between the results of the portfolios in the two asset classes should be carried out carefully. The portfolio attribution of production linked to listed equities is made using the ownership approach, which attributes the production results based on the shares owned by investors in the companies. The attribution of production linked to corporate bonds is made using the portfolio weight approach, which attributes the company's production to the portfolio based on the size of the investment into the companies relative to the investments into other companies in the same sector. Readers are invited to check Annex I where a detailed explanation of both approaches is exposed.

All results are compared to a listed equity and a corporate bond benchmark. For listed equities, the benchmark used was the ETF from iShares MSCI World index which is composed of developed market equities. For corporate bonds, the benchmark used was the iShares Global Corp Bond UCITS ETF which tracks the performance of an index composed of investment-grade corporate bonds from issuers in emerging and developed markets.

The timestamp of this report is 31st of December of 2021, therefore all data represented in the analysis below reflect a static figure of results of 31st of December of 2021. All charts represented in time horizons with start date at "2021" should be represented as end of the year of 2021 instead of the full year 2021.

4.1. Climate alignment of listed equities and corporate bonds portfolio

4.1.1. Fossil fuels: oil & gas extraction and coal mining

The potential consequences for the economy posed by physical and transition risks associated with climate change are material enough reasons for financial institutions and governments to shift financial flows away from fossil fuels. Nonetheless, the current energy crisis following the invasion of Ukraine by Russia and the inflation spike around the globe place even more urgency on a transition to a more resilient, low-carbon economy¹¹ – and therefore less dependency on fossil fuels. The potential long-term effect of the current high fossil fuel prices on clean energy transitions is still to be studied and is only just being modeled by scenario developers such as the IEA. On one hand, the high fossil fuel prices might, at least in the short term, push governments and industries to produce and stockpile more fossil fuel energy – as is evidenced by the repowering of mothballed coal power generation plant in Germany – or to subsidize such technologies due to the rise in energy bills. On the other hand, there are early signs that the energy crisis might also incentivize policymakers to invest in clean-energy infrastructure at a faster pace, producers to take action such as to reduce methane leaks or gas flaring, and consumers to improve energy efficiency or moderate consumption¹².

On the demand side of the discussion, the future is not bright for investors that still hold fossil fuel assets in their portfolios. Oil demand is expected, for the first time, to reach peak demand and show an eventual decline in all scenarios from IEA¹³, and in particular, coal faces an even more drastic decline in demand. Gas is still widely considered a bridging fuel in the energy transition, and therefore the demand is expected to grow in the next five years with sharp divergences afterward among the scenarios. Overall, the fossil fuel share in the primary energy mix is anticipated to fall around 70% by 2030 under IEA's Sustainable Development Scenario. In the IEA's net zero scenario, a significant scaling up of clean energy sources is anticipated to be required and will have the effect of reducing fossil fuel demand to the extent that no new development or exploitation will be required from 2021 onwards based.

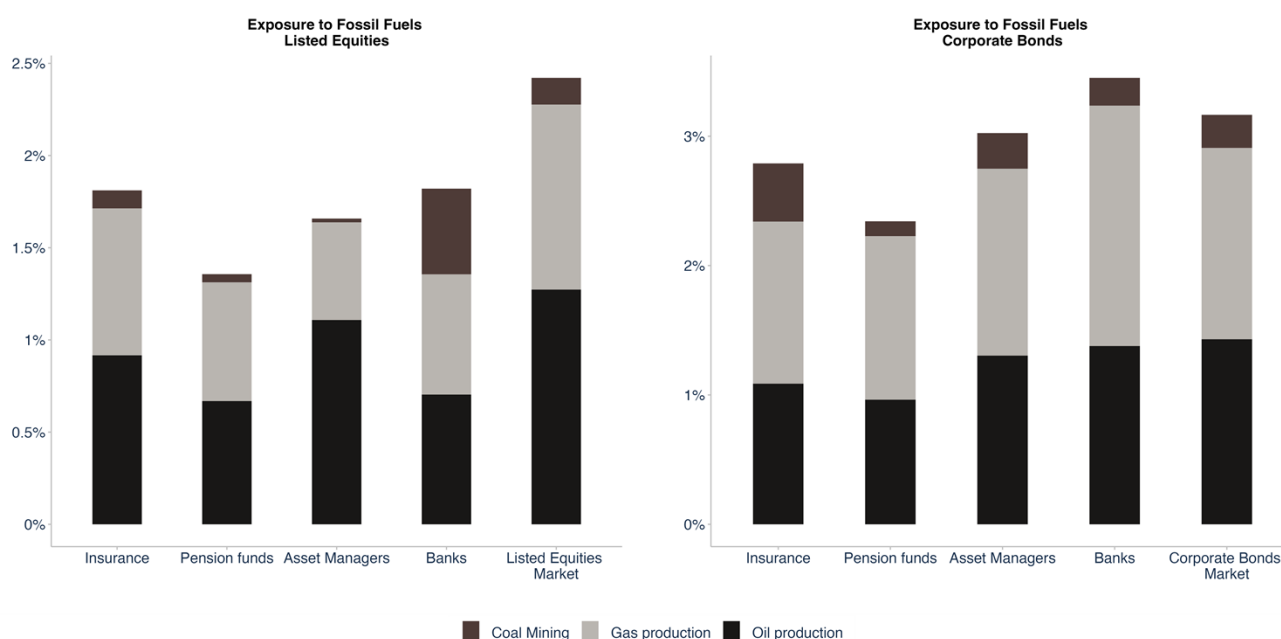
In a world where the phasing-out of fossil fuels is imminent and necessary, Swiss financial institutions seem to be doing their part in terms of divestment: around 1% of the listed equities portfolios and 3% of the corporate bonds portfolios of Swiss financial institutions are exposed to fossil fuels. This percentage contrasts with the 2020 figures when around 2-4% of the listed equities and 3-5% of corporate bonds portfolios were exposed to the sector. When compared with Norway, Austria, and Liechtenstein this result is also the lowest share of exposure found. A decrease in the exposure was seen in all groups, but it was larger in the banks and asset managers listed equities portfolios, which were exposed by around 4% and 5%, respectively, in 2020.

¹¹ Not too late – Confronting the growing odds of a late and disorderly transition, NGFS

¹² World Energy Outlook 2021, International Energy Agency

¹³ Fuels: old and new – World Energy Outlook 2021, International Energy Agency

FIGURE 9: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES (EXPOSURE) INVESTED IN COMPANIES ACTIVE IN FOSSIL FUEL INDUSTRIES, BY PEER GROUP



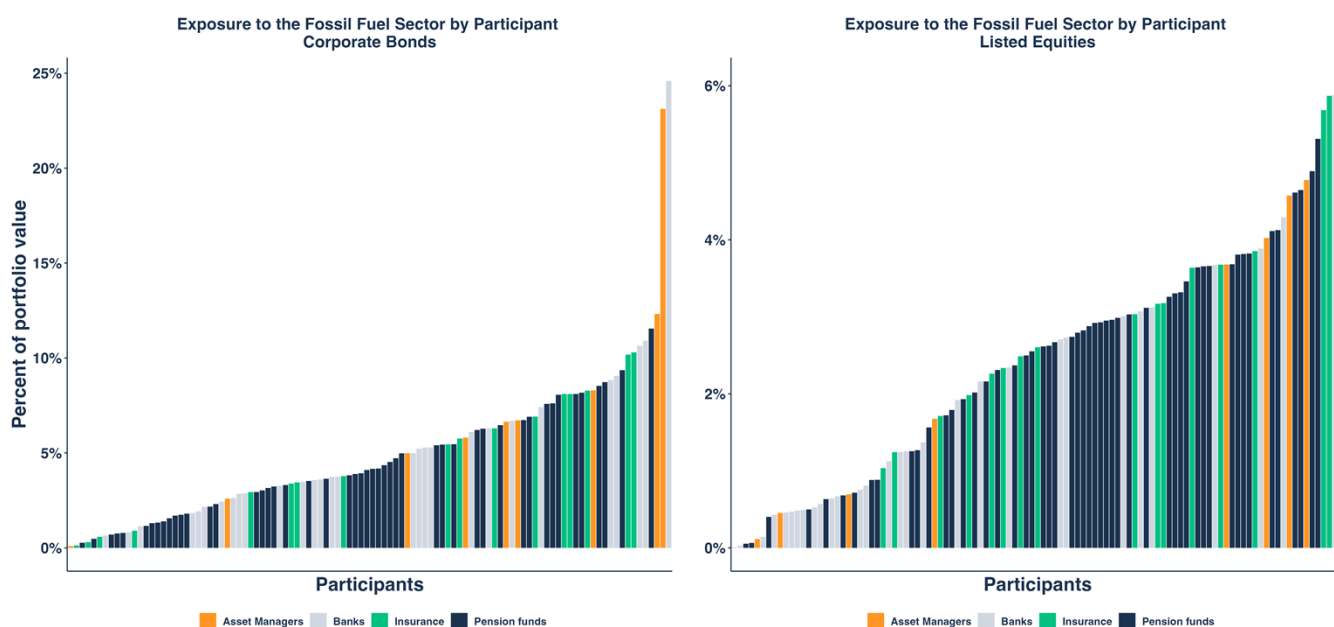
Whilst a reduction in exposure may be a positive sign, if the decrease is a result of exclusion strategies or portfolio reallocation it may not lead to an impact in the real economy. As described in a recently published report on the tracking of real-world emission reduction¹⁴, the climate performance of portfolios can only ever improve in two simple ways: through portfolio reallocation (divesting from polluting companies and investing in greener companies) or through the investee companies themselves becoming greener. While divestments and exclusion policies can achieve an impact on a company's share price and its ability to raise capital when applied in a coordinated way by many peers, such policies from the point of view of physical assets nonetheless lead mostly to virtual changes, meaning, that the physical assets may have simply been moved to another actor in the financial system. As the Swiss financial sector climate score improves, another financial market actor that has bought these assets will have likely worsened with no resulting overall changes in the final production of fossil fuels. In fact, as mentioned in previous sections, due to the voluntary nature of this study, verifying the accuracy of the data submitted to the analysis has not been feasible, therefore a thorough assessment and grounded conclusion on the impact of the decrease of the exposure is not possible.

Turning to the individual financial institutions level, no organization has exposure to fossil fuels higher than 7% in listed equities portfolios, with most of the distribution of exposures falling between 2%-4% of total exposure. The few outliers with exposure of more than 4% in listed equities portfolios belong mostly to pension funds and insurance companies. The figures for corporate bond portfolios are more drastic: almost half of the participants have

¹⁴ [Tracking real world emission reductions: The missing element portfolio alignment and net zero target-setting approaches](#)

an exposure of greater than 5% to fossil fuels. The outliers also have much greater exposures than for listed equities, reaching 25% of exposure for some institutions in the banks and asset managers sectors. Considering that fossil fuels will have to be significantly phased out in the medium term in order to reach climate goals, having high exposure to this production in a fixed-income portfolio may pose additional risks from the potential devaluation of assets under climate scenarios that predict peak demand before 2030 and a decline in demand in key market segments, such as automotive.

FIGURE 10: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES (EXPOSURE) INVESTED IN COMPANIES ACTIVE IN FOSSIL FUEL INDUSTRIES, BY PARTICIPANT



While exposures to fossil fuels have gone down, the fossil companies that remained in the portfolios of all financial sector peer groups are misaligned even with the most pessimistic climate scenario. This is an illustration that exclusion strategies do not always promote concrete changes in real production. Of the fossil companies that remained in Swiss portfolios, they are almost all far above $>2.7^{\circ}\text{C}$ pathways. In the case of the insurance peer group, the production capacity of the oil companies in which they have an ownership share is anticipated to be almost three and a half times greater than today by 2026. It is also interesting to observe that for oil production, all peer groups' alignment results are worse than the market benchmark. The figures are less dramatic for other fossil fuels – although overall Swiss financial institutions are misaligned with net zero scenarios across all fossil fuels and assets analyzed. In natural gas, the listed equity investee companies of the insurance sector plan to raise production by more than 2.5 times levels in 2021 by 2026; investee companies of asset managers and pension funds by around 1.5 times levels in 2021. In coal mining, listed equities portfolios planned production is set to increase only slightly. For corporate bonds, however, the trend for planned coal production is for it to increase by nearly 25% by 2026.

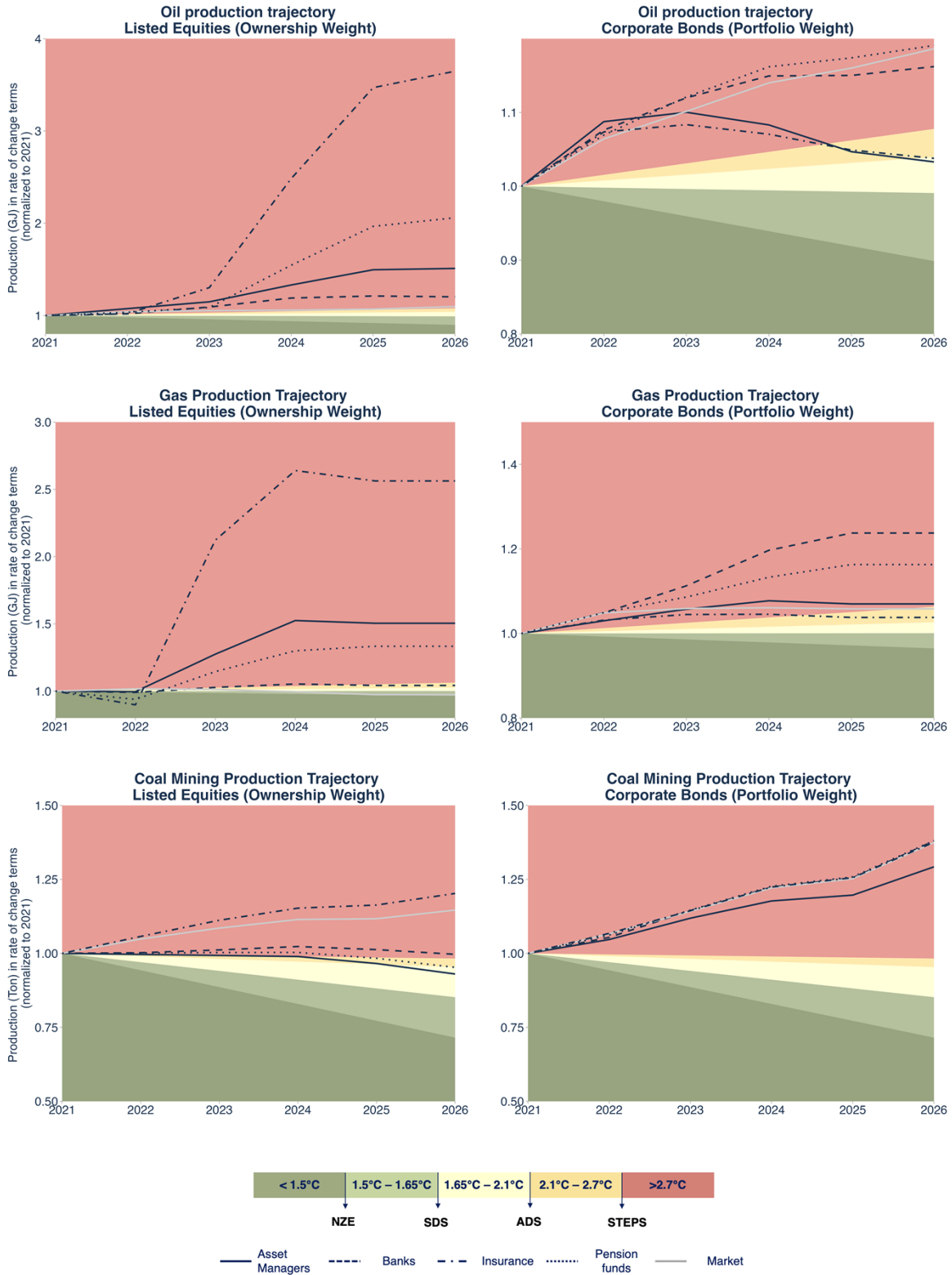
The rising production of oil and natural gas being invested in by insurance companies and pension funds in their listed equities portfolios raises concern as these are the main asset owners and they have a fundamental role to play in greening the financial system. The International Renewable Energy Agency¹⁵ reported that the combination of pension funds, insurance companies, sovereign wealth funds, endowments, and foundations manage about USD 87 trillion of assets, which reinforces the importance of these institutions in displaying confidence in the plans of major listed companies to inject new capital into new diversified clean energy projects, as well as making use of the capital markets for the re-financing of already operating clean energy assets, including renewable energy projects, in order to free up capital for new investments. Similar patterns in the production trajectories were also observed in Liechtenstein in their last PACTA exercise in 2020.

A recent analysis of the production trajectories of a representative sample of oil & gas producers showed that European majors and in particular national producers and their international offshoot currently appear to be planning large production increases to 2025¹⁶ whereas independent producers plan to reduce their planned production. Industry experts suggested that this may be due to the long lead time of investments by oil majors and national producers, with the former showing a production decline between 2030-2035. Post-pandemic and with the new energy crisis, independent production could be expected to ramp up production again using reserves such as shale gas that can be brought online quickly in response to demand. It may therefore be important to analyze further which typologies of oil & gas companies are driving the results and how they can be effectively engaged.

¹⁵ [Global Landscape of Renewable Energy Finance](#)

¹⁶ 2 Degrees Investing Initiative, *Sailing into the sunset or charting a new course?* Research paper published April 2021.

FIGURE 11: ALIGNMENT OF OIL, GAS, AND COAL MINING PRODUCTION PLANS WITH GLOBAL DECARBONIZATION SCENARIOS

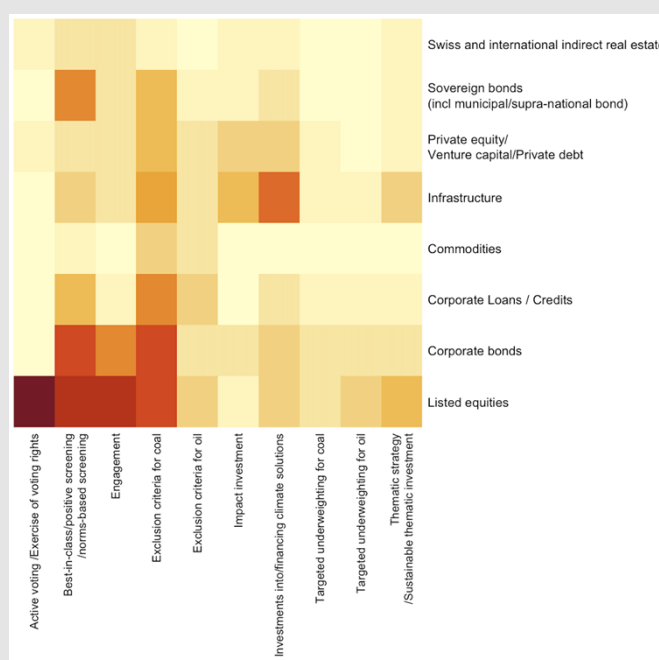


Box 3: Exclusion policies and exposure to Fossil Fuel production

The exposure and alignment analysis above suggests that Swiss financial institutions have been applying exclusionary policies and criteria for fossil fuels as part of climate-related strategies, mainly when it comes to Oil. Here we cross-check the coherence of the quantitative results with the qualitative results on climate-related strategies obtained from the survey.

The climate strategies most frequently employed by participants in Switzerland include active voting, positive screening, engagement as well as exclusion policies applied mainly in listed equity and corporate bond portfolios. The following chart shows the frequency of climate-relevant strategies deployed by participants in Switzerland in different asset classes.

FIGURE 12: FREQUENCY OF CLIMATE STRATEGIES BY SWISS PARTICIPANTS DEPLOYED BY ASSET CLASS



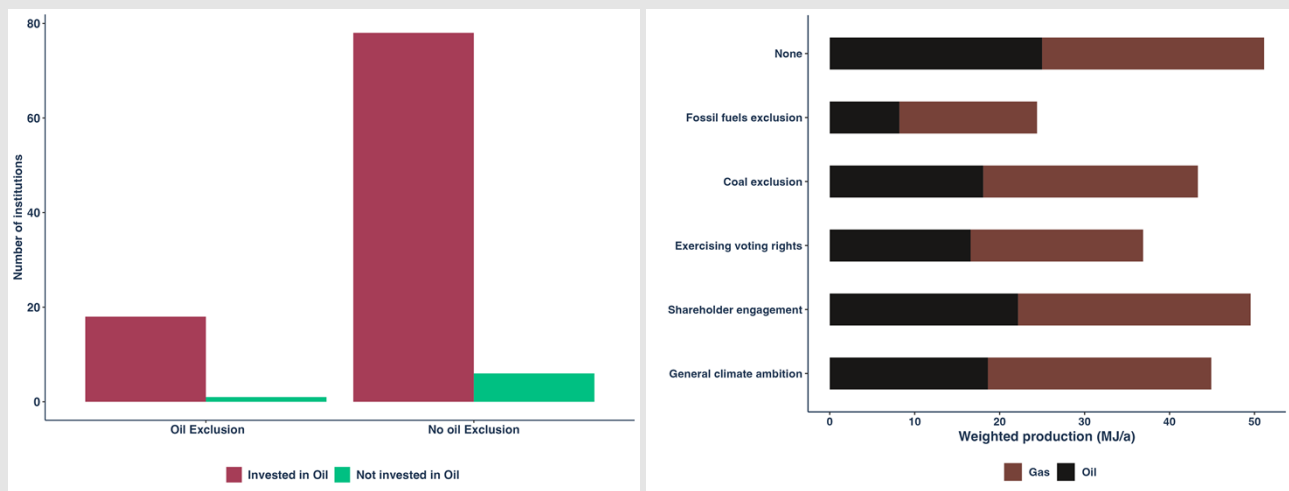
According to our analysis of the survey response in relation to climate strategies and the ambitions of financial institutions on their climate goals, exclusionary criteria seem to be already well-settled as a climate strategy in Switzerland. Nonetheless, the nature of exclusionary criteria was not formally defined in the survey question. As a result, each financial institution may have its own interpretation and apply the concept differently. For instance, exclusion criteria can be understood to mean:

- A reweighting of exposure in fossil fuels assets in relation to the total portfolio to not surpass a given percentage of the portfolio;
- Exclusion of exposures in direct investments but not in indirect investment (i.e. funds);
- Exclusion of companies that do not have a transition plan or that do not meet specific performance targets measured using specific KPI
- Exclusion of a company that has not responded to engagement requests (divestment);
- Exclusion of exposure according to a cut-off threshold for materiality e.g. 5% of company revenue;
- Exclusion of any exposure to the sector.

The two charts presented below seek to compare the qualitative survey answers on the use of an exclusions policy, as well as other strategies, with PACTA exposure results from listed equities. Firstly, we filter for all financial institutions with exposure to Oil and/or Coal – which leaves us with 103 financial institutions. In the left-hand chart, we then look for those participants who actively marked in the qualitative survey that they apply an exclusion policy to oil and gas issuers. The right-hand chart shows the production weighted exposure to oil & gas of Swiss financial institutions cross referenced with the different climate strategies they apply. The analysis shows that indeed an exclusion policy in fossil fuels translate (Climate Action 100+, 2022) (RMI, 2022) (Barnet & Peura, 2022) (State Secretariat for Sustainable Finance, 2022) (Swiss Federal Statistical Office, 2022)s to a lower production weighted exposure in oil & gas.

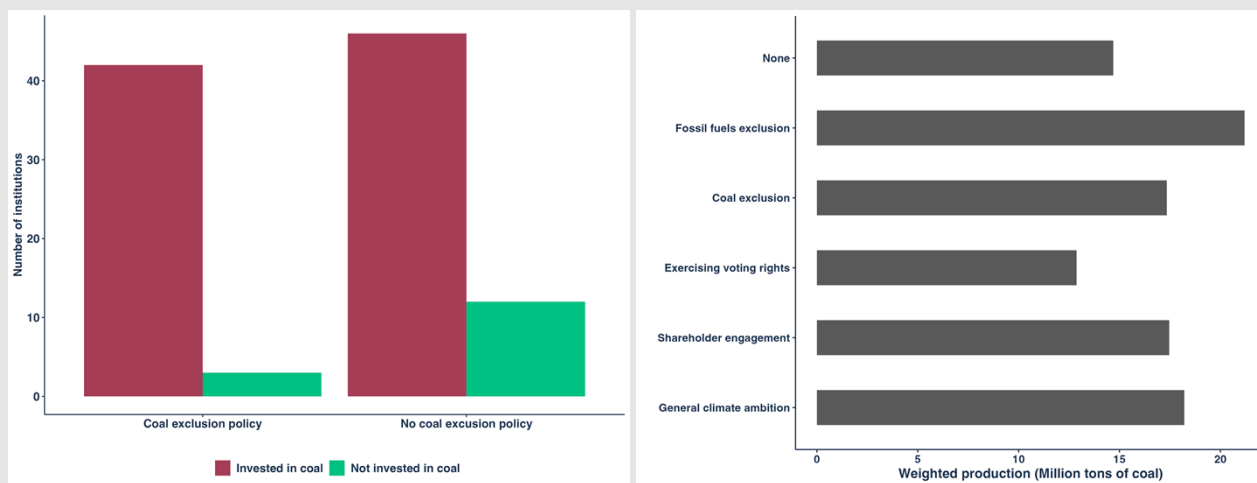
Out of the 19 financial institutions who marked that they applied an oil exclusion criteria and submitted portfolios for analysis, 18 have some exposure to listed equities linked to oil production either direct or indirectly. Only 1 financial institution who actively reported having exclusionary criteria and submitted portfolios does not have any exposure to Oil production. However, we can see on the chart on the right side that, indeed, an oil exclusion criteria leads to lower weighted production exposure.

FIGURE 13: NUMBER OF RESPONDENTS WITH OIL EXCLUSION POLICIES COMPARED TO WHETHER THEY ARE INVESTED IN OIL (LEFT); WEIGHTED PRODUCTION EXPOSURE OF OIL AND GAS CROSS-REFERENCED TO THEIR CLIMATE STRATEGIES (RIGHT)



When it comes to coal, out of the 45 institutions which reported applying exclusionary criteria to coal production activities and submitted portfolios, 42 have exposure to companies producing coal while 3 don't have any exposure. In this case it is also interesting to note that 58 participants didn't report having any exclusionary criteria for coal: of which 46 have exposure while 12 don't have exposure. When we look to the weighted production assigned to the portfolios, an exclusion policy in coal or oil actually leads to the same or higher production than most of other applied strategies.

FIGURE 14: NUMBER OF RESPONDENTS COAL EXCLUSION POLICIES COMPARED TO WHETHER THEY ARE INVESTED IN COAL (LEFT); WEIGHTED PRODUCTION EXPOSURE OF COAL CROSS-REFERENCED TO THEIR CLIMATE STRATEGIES (RIGHT)



It is important to remember that exposure in itself is not a problem if financial institutions actively engage with companies to seek take action to phase-out high-carbon technology while investing in and switching their production to low-carbon alternatives. Additionally, as we mentioned earlier in this box, exclusionary policies and criteria can have different meanings, and therefore it is not always expected that they translate into no or very low exposure to fossil fuels. In fact, emerging evidence suggests that the most effective exclusionary policies may be those that are conditional, for example on achieving certain performance KPIs or technology investments. Nonetheless, exclusion policies should be combined with a clear communication policy explaining the existing exposure and the strategies put in place to reduce the exposure in the short/medium-term.

4.1.2. Power

There is increasing evidence that a transformation is happening in the real economy, with power production and consumption has experienced dramatic changes in the past 5 years. Beyond the Covid-19 pandemic and the current energy crisis that has influenced consumer behavior, the build-up of the capacity of renewable sources of energy such as wind and solar PV increased at their fastest rate following a rapid cost decrease that has made them more bankable than fossil fuel production in most regions¹⁷. As electricity and the electrification of transport and heavy industries such as steel production becomes a central piece of the energy transition, financial flows are required to build out new capacity and invest in the required technology transitions. According to the IEA:

“Since 2016, global investment in the power sector has consistently been higher than in oil and gas supply. The faster that clean energy transitions proceed, the wider this gap becomes, and as a result electricity becomes the central arena for energy-related financial transactions.” (International Energy Agency, 2021)

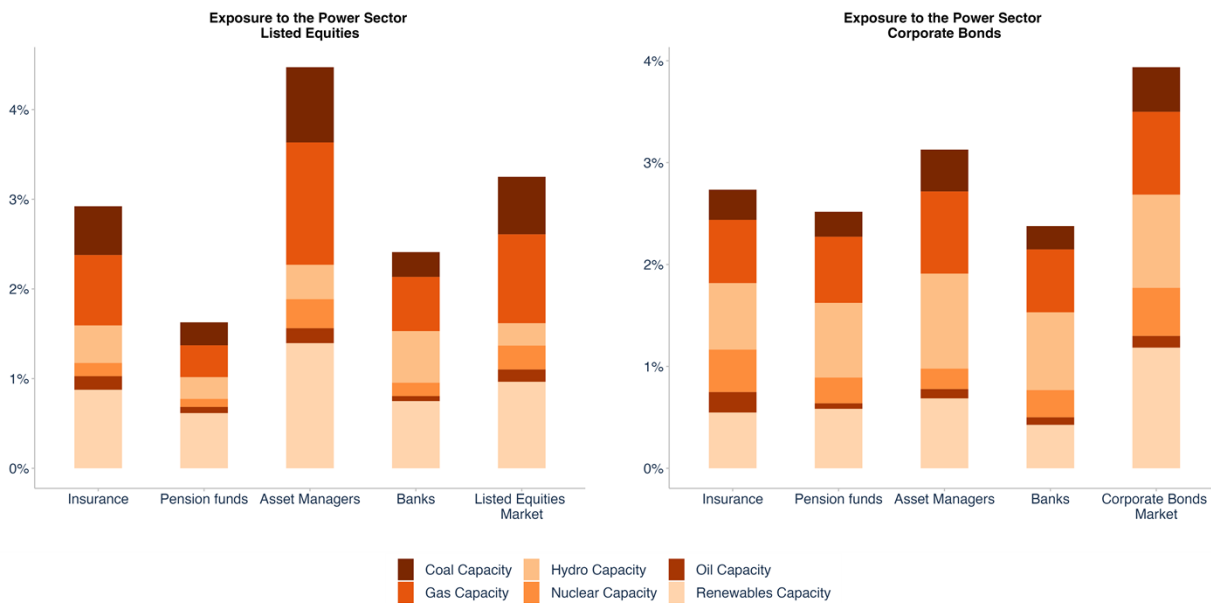
¹⁷ Global Energy and Climate Outlook 2021: Advancing towards climate neutrality, Joint Research Centre

In the IEA’s net zero Energy scenario, electricity amounts to 50% of total final energy use by 2050. The European Commission’s Joint Research Centre anticipates in their GECO 1.5oC Uniform scenario that 78% of total energy generated by 2050 should be from renewable sources (mostly wind and solar).

Looking back to 2020 signs of significant financial flows running from high to low-carbon technologies in the assets of Swiss financial institutions were not yet apparent. Between 2-5% of the aggregate Swiss portfolios were exposed to the power sector.

In this round of the PACTA Climate Test Switzerland, even though the general exposure decreased slightly to around 1.5%-4% of total portfolios, the relative exposure of low and high-carbon technologies remains broadly the same. Around half of the total exposure in listed equities across each peer group is in high-carbon technologies. The exposure of financial institutions in renewables technologies (onshore wind, bioenergy, solar PV, solar CSP, offshore wind, geothermal, and ocean tidal), is around a third of the overall power exposure, amounting to between 1% and 2% across all peer groups and asset classes.

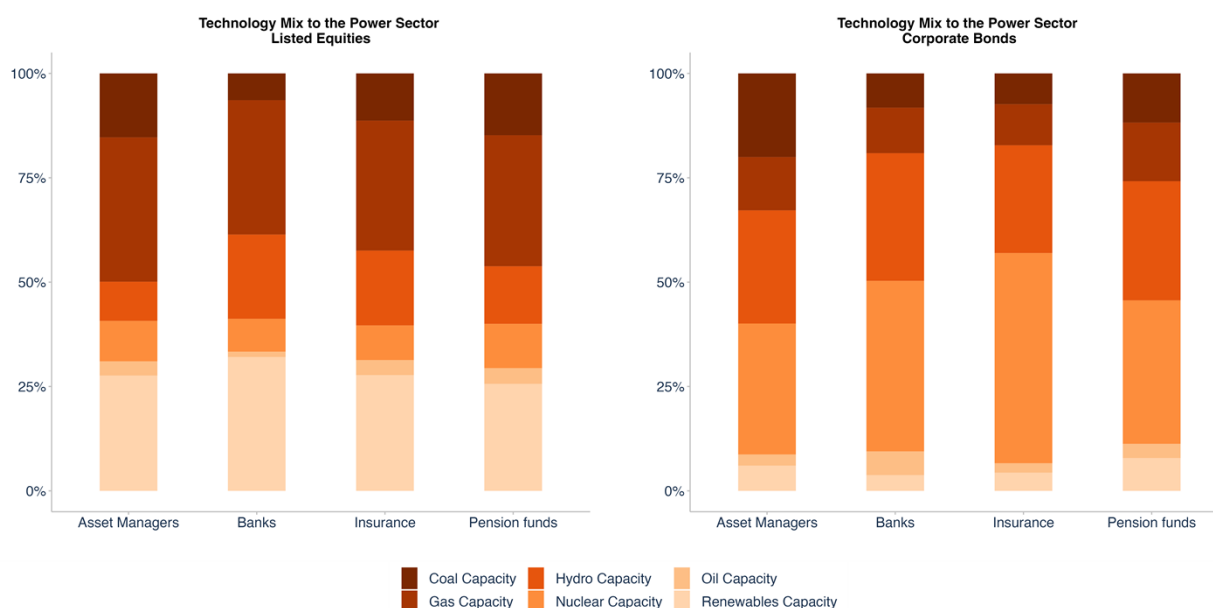
FIGURE 15: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES INVESTED (EXPOSURE) IN COMPANIES ACTIVE IN THE POWER SECTOR, PER PEER GROUP



It is interesting to note that across corporate bond portfolios, Swiss financial institutions are significantly less allocated fossil fuels and have a notably higher share of investments to nuclear and hydropower capacity (20%– 30%) compared to the total investments in the power sector – this is clear when looking to the technology mix of their total investments in the power sector in the chart below. Hydropower is considered a renewable technology in most climate scenarios even though, depending on the location, it can be limited in its life span, cause ecosystem damage, and lead to methane emissions. The pattern of having a higher share of total investments in the power sector allocated in nuclear and hydro capacity could already

be seen in 2020, but the share has increased significantly in this year's Climate Test mainly for the asset managers and bank peer groups. This increase in exposure must be seen in the context of three background trends: i) the beginnings in the second half of 2021 of a major energy crisis in Europe mainly focused on fossil fuels prices and gas supply issues, ii) the approval by the European Union to label nuclear power as a green technology¹⁸, and iii) announcement of the creation of the first Nuclear Green Bonds in Europe¹⁹.

FIGURE 16: TECHNOLOGY MIX AS % OF POWER SECTOR, PER PEER GROUP

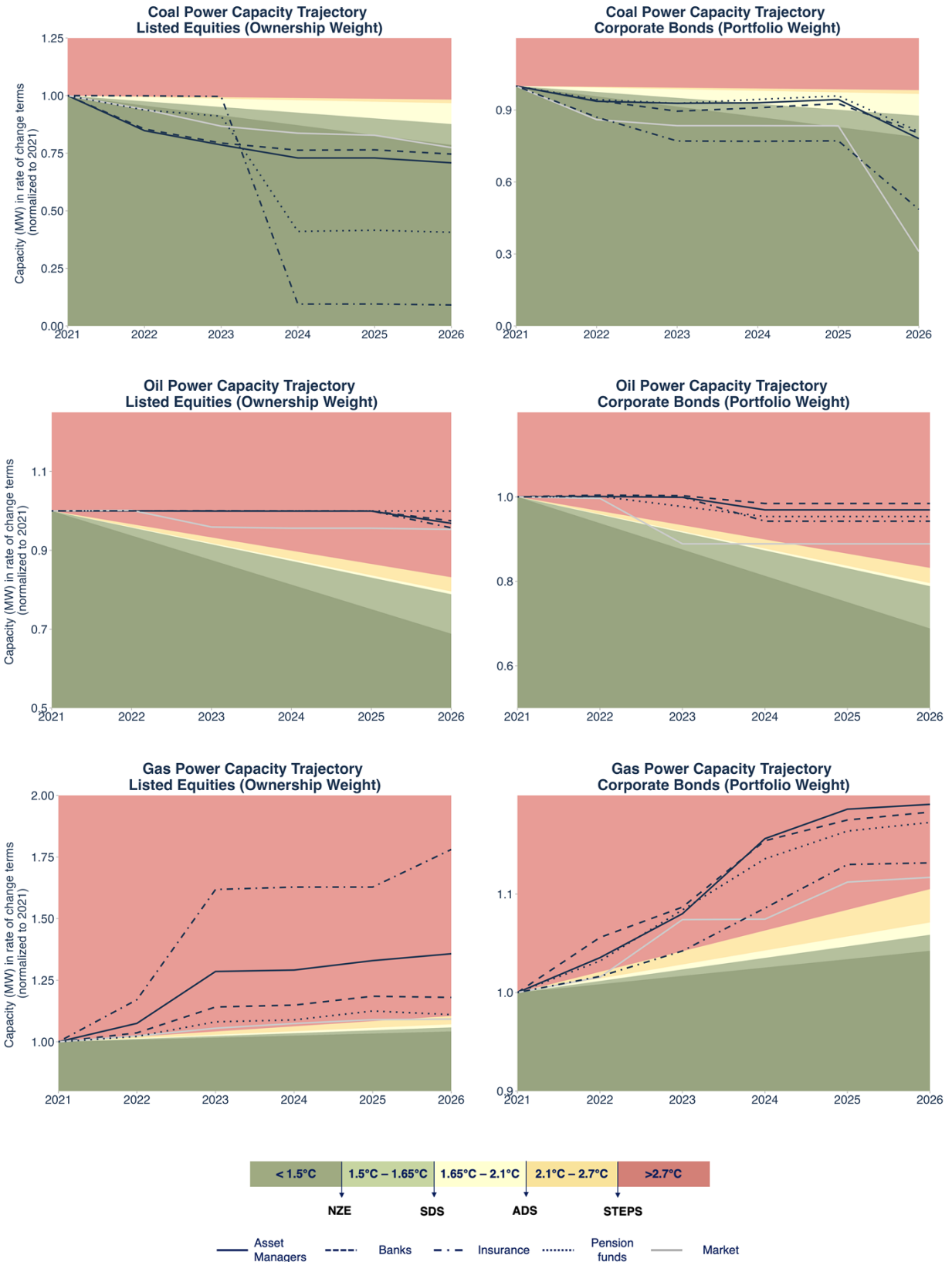


In terms of alignment in high-carbon power technologies, Swiss financial institutions are aligned across listed equities and corporate bonds with a net zero scenario in coal capacity, meaning coal power capacity will decline fast enough to be on a net zero pathway. For listed equity portfolios all peer groups are anticipated to perform better in terms of power coal capacity than the market benchmark by 2026. However, for gas power capacity, all groups appear misaligned in being invested in higher planned production than the net zero scenarios allow for. It is important to remember that according to even ambitious scenarios gas is considered a transition technology, and, as a result, the IEA net zero and sustainable development scenarios still allow for a small increase in production in the short term. Nonetheless, Swiss financial institutions are set to increase gas capacity significantly more than the scenarios anticipate. The oil power capacity financed by Swiss financial institutions is set to remain roughly stable across the next 5 years in listed equities portfolios and to decline slightly in corporate bonds portfolio, but they are neither aligned with the net zero nor the sustainable development scenario.

¹⁸ [EU Lawmakers Remove Last Hurdle to Label Gas, Nuclear as Green](#) by Bloomberg News

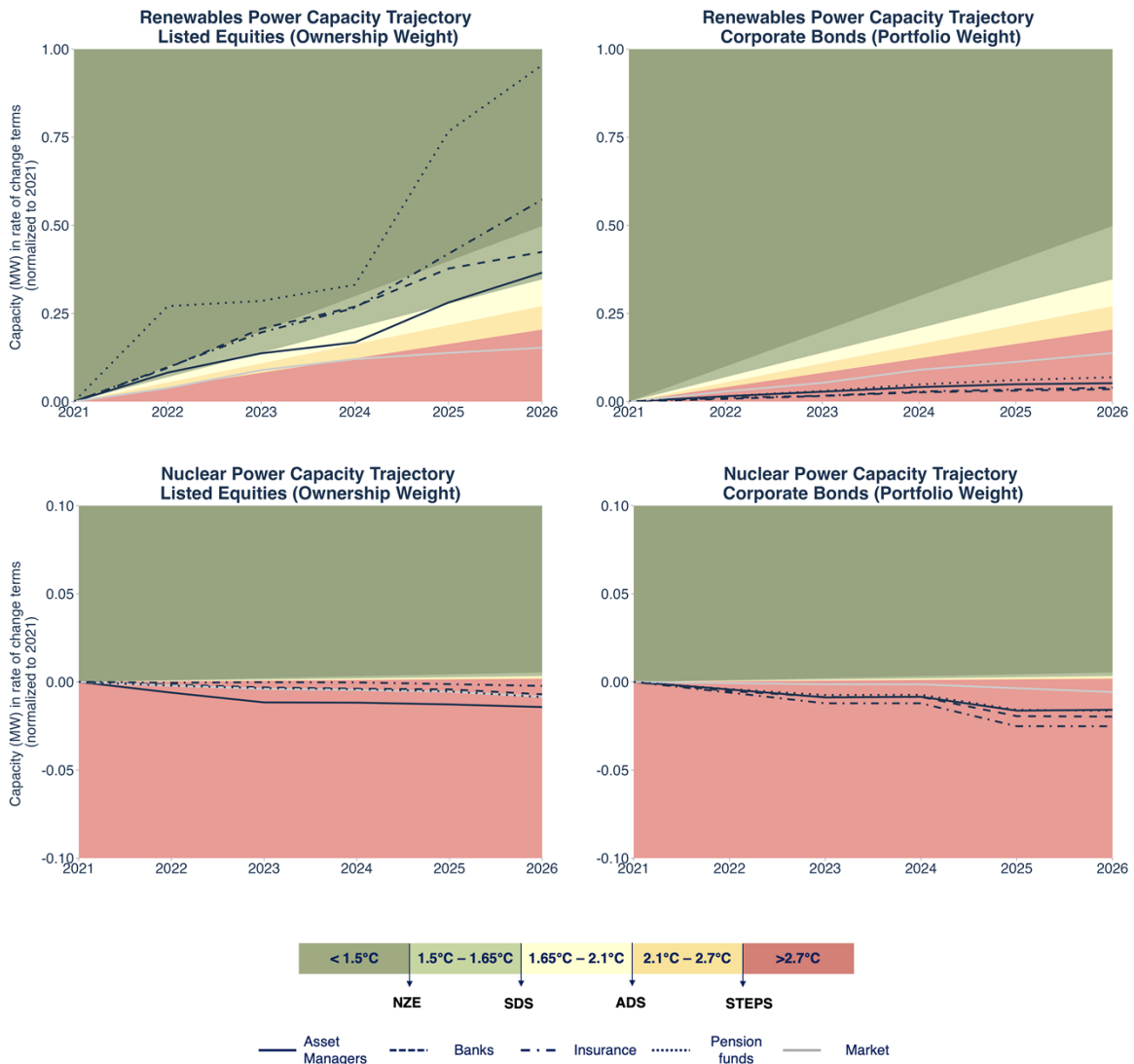
¹⁹ [Once-Unthinkable Nuclear Green Bonds Are Coming to Europe](#) by Bloomberg News

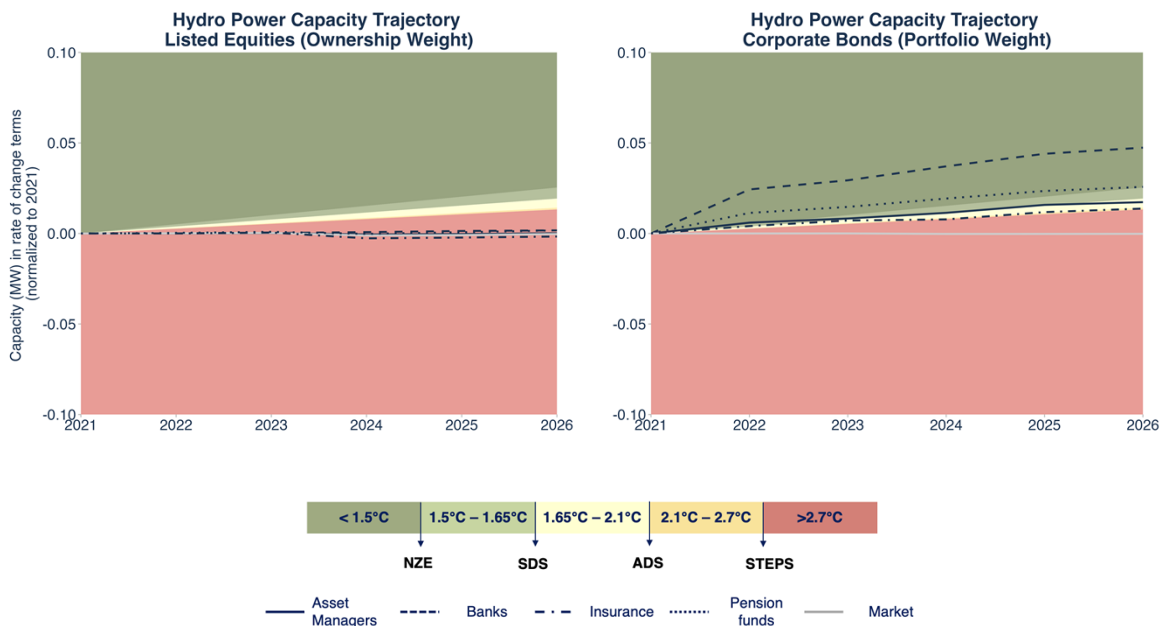
FIGURE 17: ALIGNMENT OF COAL, OIL, AND GAS POWER CAPACITY PLANS WITH GLOBAL DECARBONIZATION SCENARIOS



Although Swiss financial institutions increased their exposure to low-carbon technologies since the last round of the PACTA test, the production capacity invested is still not fully aligned in all peer groups. Investment through listed equities in companies building out renewable power capacity is anticipated to be aligned by 2026 with the sustainable development scenario in the case of banks and asset managers, and with the Net Zero scenario in the case of insurance undertakings and pension funds. All peer groups perform better than the market benchmark. In contrast, production capacity invested in by corporate bond portfolios is not anticipated to be aligned at any stage during the next 5 years and is also below the market benchmark. In nuclear power capacity – the technology that has increased the most in terms of the exposure of Swiss financial institutions’ portfolios – the production planned by companies invested in is set to remain roughly stable in the next 5 years with only a very small decline in corporate bonds portfolios.

FIGURE 18: ALIGNMENT OF RENEWABLE, NUCLEAR, AND HYDRO POWER CAPACITY PLANS WITH GLOBAL DECARBONIZATION SCENARIOS





4.1.3. Automotive

The automotive sector is one of the sectors facing a fast-paced change when it comes to transition driven by regulatory commitments to reduce vehicle emissions and in some markets such as in the EU to set a date for the phase out of Internal Combustion Engine (ICE) vehicles. According to scenarios, broader sustainability drivers also include modal shift, shared mobility services, autonomous driving and connected vehicles²⁰. In particular, consumer behavior has been observed to have changed after the COVID-19 pandemic, with scenario developers such as the JRC factoring into their modelling the influence of remote working on travel patterns and the emerging preference of consumers for cleaner electric or hybrid vehicles²¹.

In this sense, the switch from light-duty vehicles based on internal combustion engines to electric or plug-in hybrid vehicles can be seen as one of the major opportunities for a green economic transition. All major below 2°C scenarios anticipate that the demand for ICE cars will fade and eventually cease as sales of battery-electric vehicles increase from 5% of new-car sales today to almost 100 percent by 2050 or earlier as the ICE vehicle stock is gradually replaced. An important change to note in this Climate Test is in the classification of mild hybrid vehicles in IEA and JRC scenarios, which are now included within the ICE category. The hybrid category now consists exclusively of plug-in hybrid technology.

Nonetheless, it is important to note that the overall life cycle emissions of electric and plug-in hybrid vehicles are important to take into account. Two factors contribute significantly to the total life cycle emissions of plug-in hybrid and electric cars: the

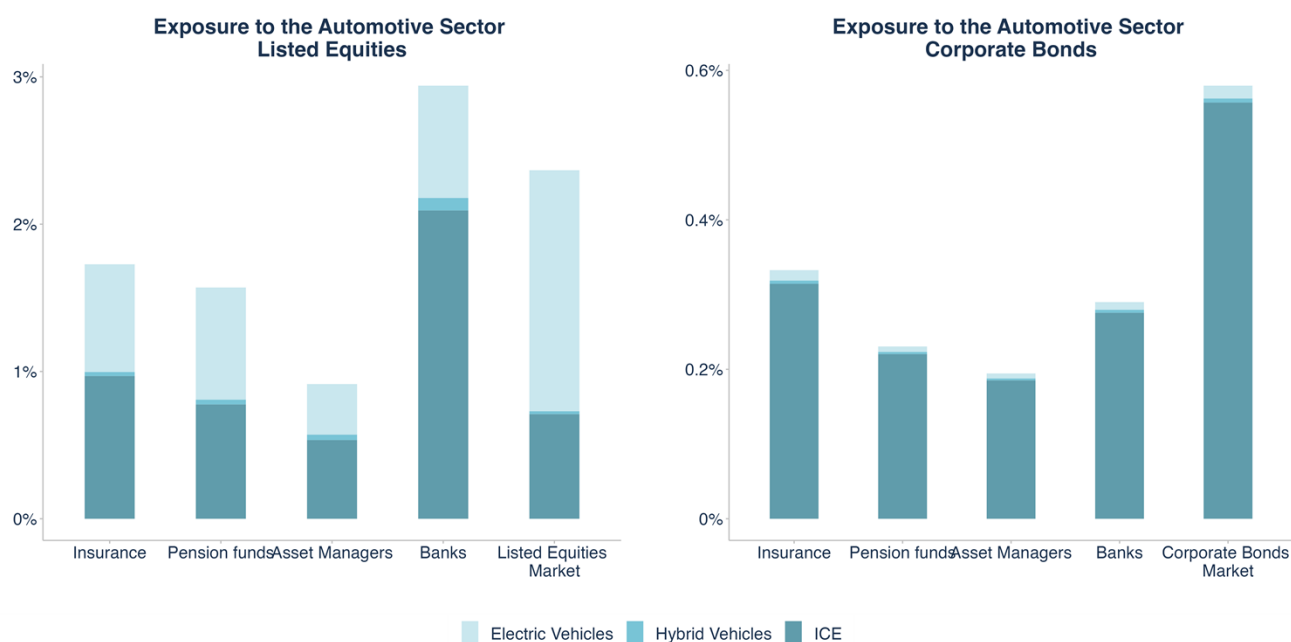
²⁰ Sustainability in the automotive industry

²¹ Why consumers are charging toward electric vehicles

manufacturing of their batteries and the power grid mix where these vehicles operate. Overall, electric and plug-in hybrid vehicles tend to have lower average full-lifecycle CO₂-eq emissions than internal combustion engines, but this is dependent on the decarbonization of the electricity sector as a necessary condition for zero emissions road mobility ²².

The total exposure of Swiss Financial institutions to the automotive sector (only Light-Duty Vehicles²³) is around 1%-3% of total listed equities portfolios, with banks being the most exposed. Corporate bonds portfolios have almost no exposure to the sector. In comparison, in 2020 listed equity portfolios were exposed by 1%-2% and corporate bonds portfolio 2%-4%. Even though the exposure to internal combustion engines (ICE) production is higher than to electric and hybrid production, the share of the latter increased substantially in this round of the test. Nonetheless, the exposure of all peer groups to low-carbon automotive technologies is lower in comparison to the listed equities market benchmark. In corporate bonds portfolios, almost the totality of the exposure is to ICE production.

FIGURE 19: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES INVESTED (EXPOSURE) IN COMPANIES ACTIVE IN THE AUTOMOTIVE SECTOR, PER PEER GROUP

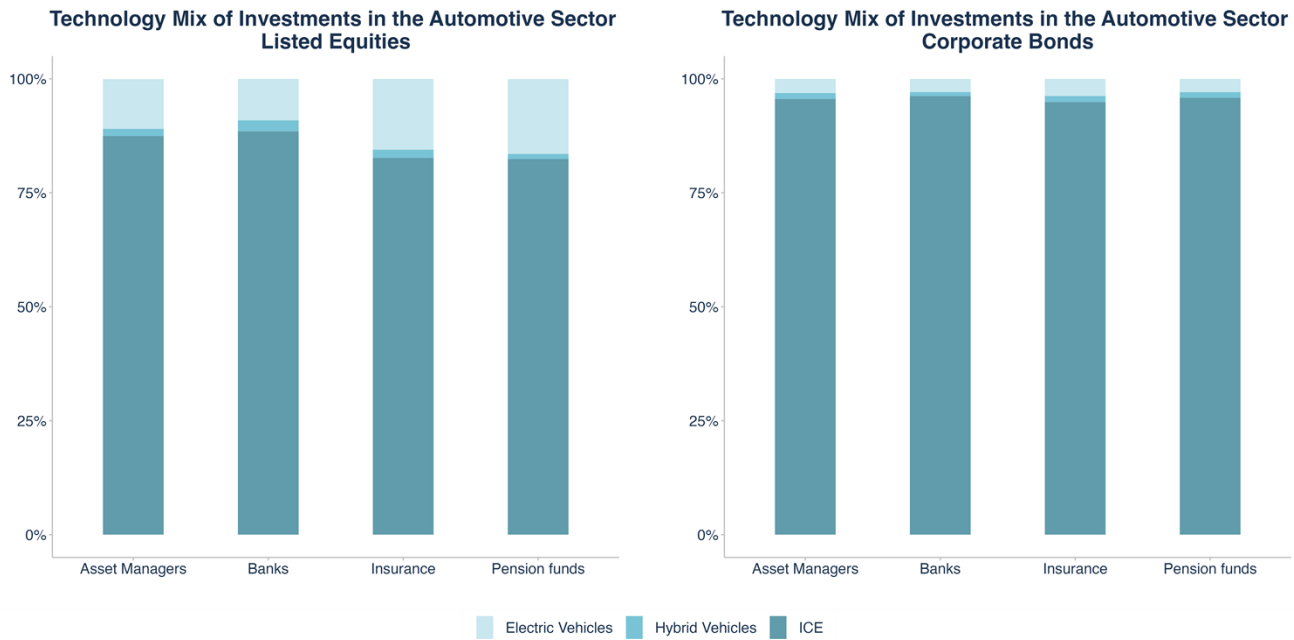


In terms of the technology mix of the exposure to the automotive sector, ICE is still the predominant technology despite the increase in relative exposure to low-carbon technologies. In listed equity portfolios, ICE production represents between 60% and 80% share of total exposure to the automotive sector, far lagging behind the benchmark; in corporate bonds, the share increases to around 95%. This difference between the financial exposure to the technologies and the technology mix of the underlying production of investee companies may be due in part to the greater market capitalization of hybrid and electric vehicle producers.

²² European Environment Agency (2018) *Electric vehicles from life cycle and circular economy perspectives*

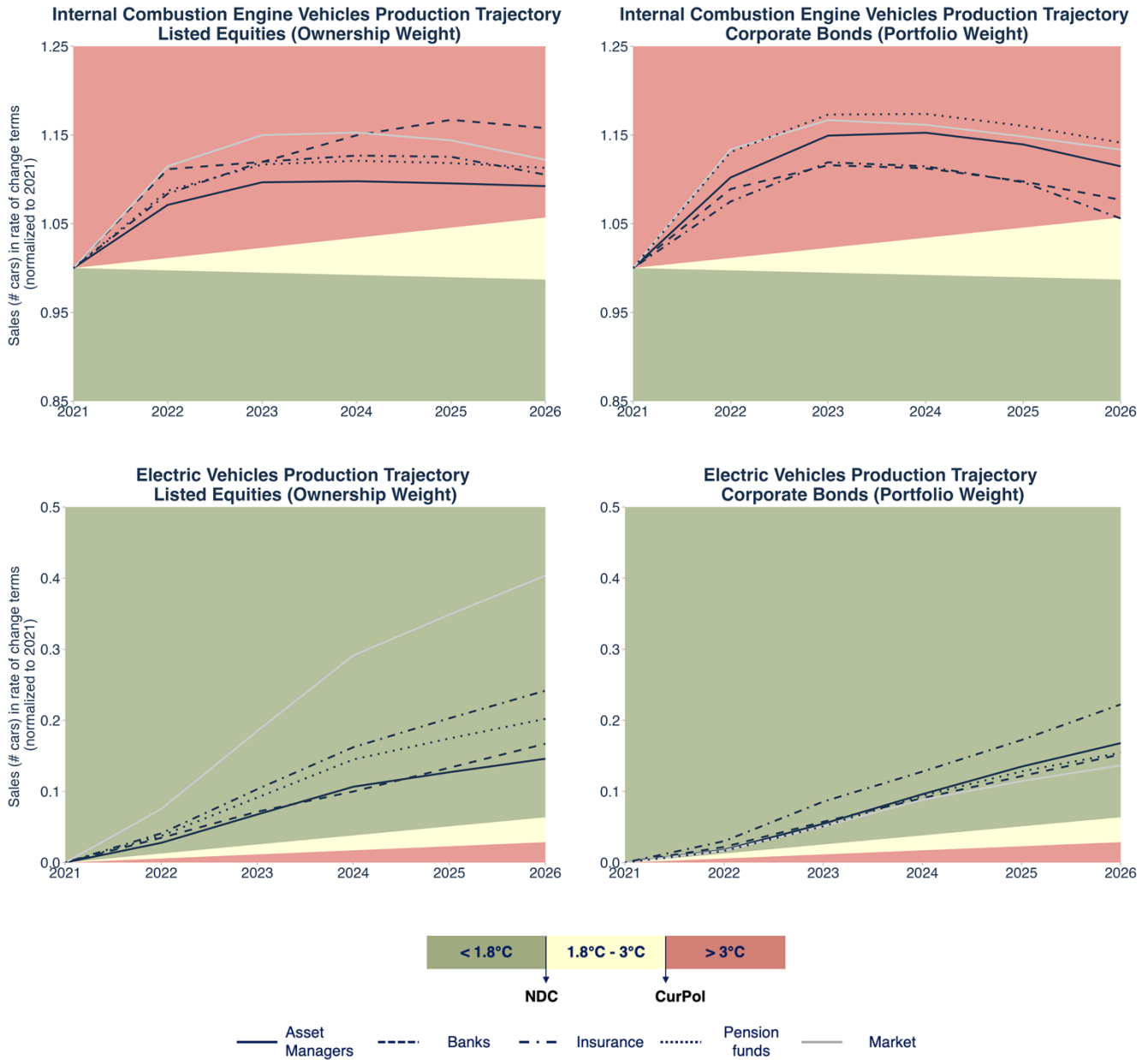
²³ The scope of LDV manufacturing for the purposes of this PACTA analysis is: Full-sized Light Trucks, Luxury/Sports Cars, Medium sized Cars, Mid-sized Light Trucks, Small sized Cars, Small Light Trucks.

FIGURE 20: TECHNOLOGY MIX AS % OF AUTOMOTIVE SECTOR, PER PEER GROUP



When comparing the production plans of investee companies in ICE-based vehicle production with the scenarios of the Joint Research Centre we find that production is misaligned and on a greater than 3°C pathway for the next 5 years for both asset classes. On the other hand, the production plans for electric vehicles are aligned with a 1.8°C scenario pathway for both asset classes. The production plans of companies associated with corporate bond holdings have better alignment than the market benchmark, but in listed equities, all the peer groups are below the listed equity market benchmark.

FIGURE 21: ALIGNMENT OF INTERNAL COMBUSTION ENGINE AND ELECTRIC VEHICLES WITH GLOBAL DECARBONIZATION SCENARIOS



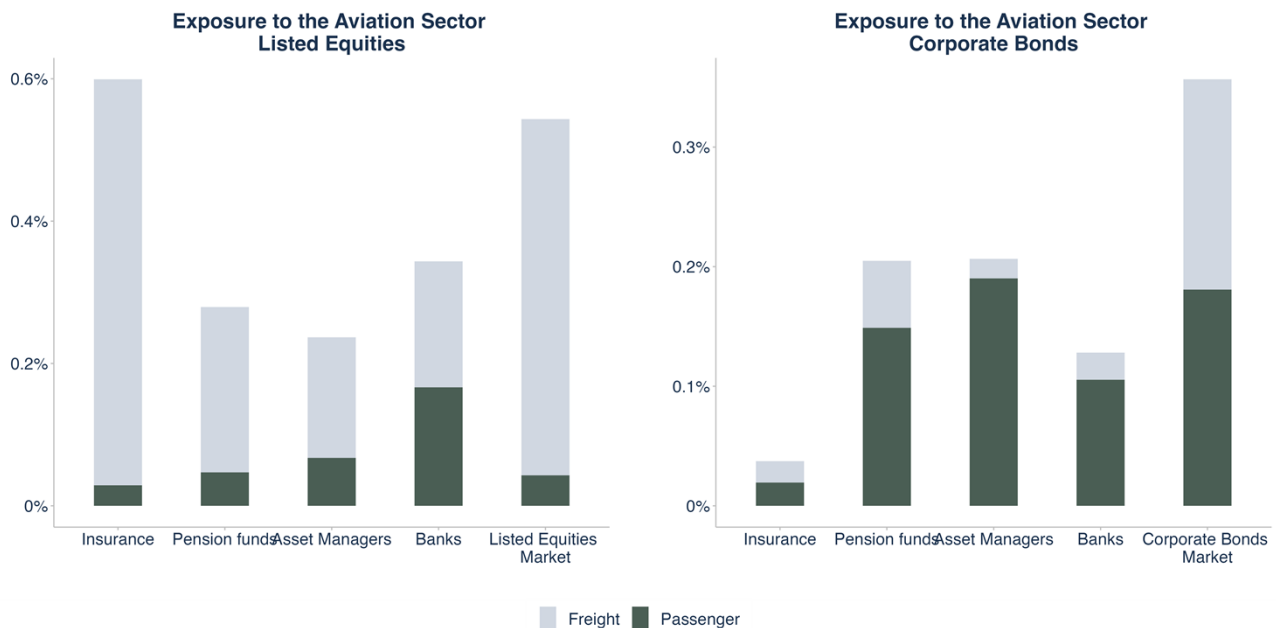
4.1.4. Aviation

The aviation sector is one of what are called hard-to-abate sectors – in other words, it is a sector in which the transition is not likely to be as straightforward due to technological, regulatory and economic constraints. Whilst scenarios point to the need to commercialize a combination of new propulsion technologies and more sustainable fuels, it will likely not be before 2030 that both can be more widely implemented. For

example, initiatives like the ZEROe²⁴ from Airbus are set to produce hydrogen propulsion commercial aircraft, but only by 2035. Until 2030, airline operators will have very little margin to reduce emissions in their operations. According to scenario assumptions, best practices may include small improvements in their operations, including utilization rates, and the retirement of old aircraft²⁵ combined with the acquisition of newer and more fuel-efficient aircrafts²⁶. As a result, financial institutions willing to green their portfolios in this sector should consider in the near term the extent to which airlines are focusing on improving operational efficiency and the composition of aircraft fleets. Given the long lead times for investing in new aircraft and the long-lead times for innovation in the sector, it is also important that investee companies are already engaged in the development and trial of new low or zero-carbon fuels and technologies, so as to ensure that they are commercialized in time to maintain the pace of sectoral decarbonization. Moreover, joining sectoral-focused initiatives like the Climate-Aligned Finance Working Group for the aviation sector convened by RMI²⁷ can help financial institutions understand the sector better and how to engage with airlines and other stakeholders in order to reduce emissions of the companies they are investing in.

Swiss financial institutions have less than 0.6% of their listed equities and corporate bonds invested in the aviation sector, encompassing both commercial passenger airlines and freight carriers. There is higher exposure to freight in listed equities and passenger airlines in corporate bonds.

FIGURE 22: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES INVESTED (EXPOSURE) IN COMPANIES ACTIVE IN THE AVIATION SECTOR, PER PEER GROUP



²⁴ ZEROe: Towards the world's first zero-emission commercial aircraft

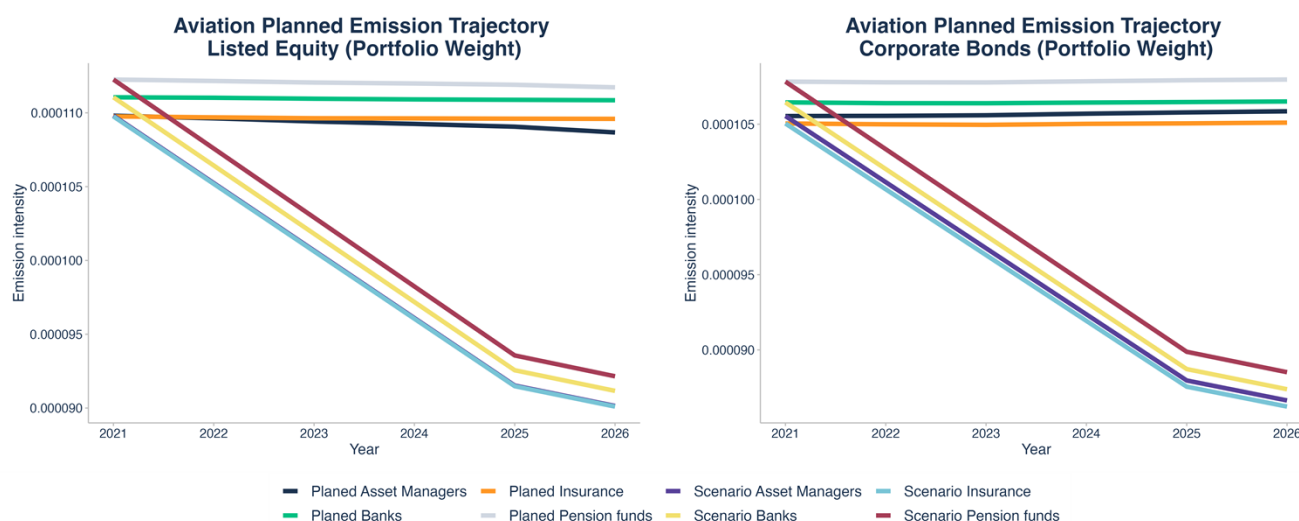
²⁵ It is important to consider how retirement is done by the airline. Around 90% of an aircraft can be recycled, and the main manufacturers have advanced end-of-lifecycle processes in place.

²⁶ 4 ways airlines can reduce their carbon footprint

²⁷ Six Global Financial Institutions Chart a Flight Path to Decarbonizing Aviation

The alignment results measured using emissions intensity show a disparity between the reductions that airlines should be targeting (the scenario trajectory) and the trajectory based on their current plans. Airlines will have to already reduce their emissions intensity per revenue passenger kilometer and per tonne of freight handled by between 10 and 20% in the next 5 years, which the current trajectories indicate is not yet sufficiently planned for by the companies invested in by Swiss financial institutions. As a result, the equity and corporate bond portfolios that have been analyzed are not aligned in this sector.

FIGURE 23: CURRENT FLEET EMISSION INTENSITY VS REDUCTION REQUIRED UNDER GECO 1.5C SCENARIO FOR THE AVIATION SECTOR, PER PEER GROUP



4.1.5. Steel

The steel sector accounts for roughly 4% of global CO₂ emissions and is, at the same time, an emissions-intensive²⁸ and hard-to-abate sector. With the demand for steel under business-as-usual scenarios projected to grow by 30% by 2050, the financial sector has a key role to play, with lending in particular being one of the largest sources of capital for the steel sector. According to the World Energy Outlook 2021, the iron and steel sectors are one of the largest contributors to the ambition gap between the Announced Policies Scenario (APS) and the Net Zero Scenario (NZE). The Net Zero Scenario includes an assumption of lower steel demand due to improvements in the steel-intensive industries, an increase in the steel recycling rate and the more resource-efficient use of steel in end-uses such as construction.

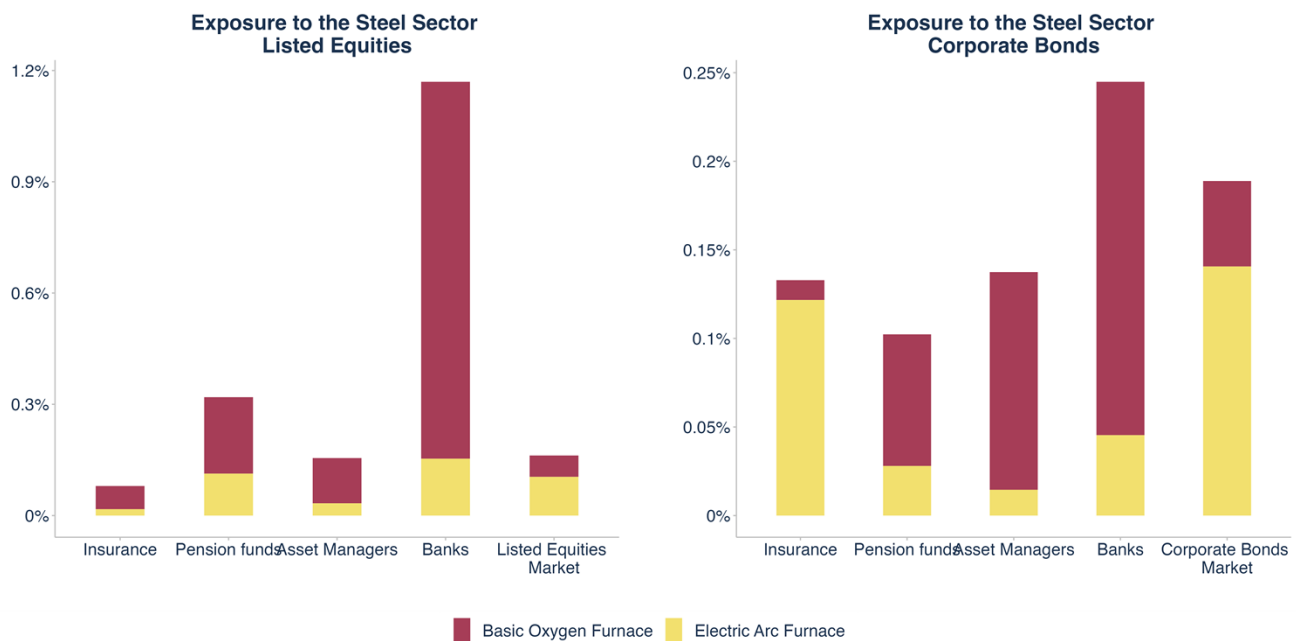
Regarding the technologies available in the sector, Electric Arc Furnace (EAFs) is key to decarbonizing the steel sector as it draws upon secondary scrap steel and is considerably less energy-intensive than primary production from iron ore and then pig iron. The industry is currently dominated by Blast Furnace (BF) and Basic Oxygen Furnace (BOF) technology, which relies on the use of coal as an energy source and reducing agent. The emissions intensity of EAF plant is to a great extent reliant on electricity grid decarbonization.

²⁸ The [Sustainable Steel Principles](#), September 2022

A number of technologies are anticipated to be needed in order to transition to net zero steel production, including EAF, direct reduced iron (DRI), the use of natural gas, hydrogen and biomass as fuel and reducing agents, and the use of carbon capture²⁹. Whilst EAF technology is commercially available, most of the other transition technologies are still under development so in order to meet 2030 and 2035 emissions intensity reductions it is important that steel producers are already involved in their development and testing. A range of upgrade pathways will then be available to operators of iron blast furnace, BOF steel, and EAF steel plant.

Swiss financial institutions' portfolios are between 0.1%-1.2% exposed to the steel sector and the largest part of their exposure is allocated to production that is based on Basic Oxygen Furnace (BOF) technologies. As mentioned at the beginning of this report, the banks' peer group significantly increased their exposure to this sector in their listed equity portfolios when compared to the 2020 results. Previously the exposure was about 0.7% of the total portfolio and now it accounts for almost 1.2% of the total portfolio, which is also above the exposure of the listed equity market benchmark. Around 90% of the banks' peer group's exposure is still allocated to production based on BOF technology, nonetheless. In contrast, the insurance peer group's exposure to bonds issued by steel producers is overwhelmingly exposed to production based on EAF technology.

FIGURE 24: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES INVESTED (EXPOSURE) IN COMPANIES ACTIVE IN THE STEEL SECTOR, PER PEER GROUP

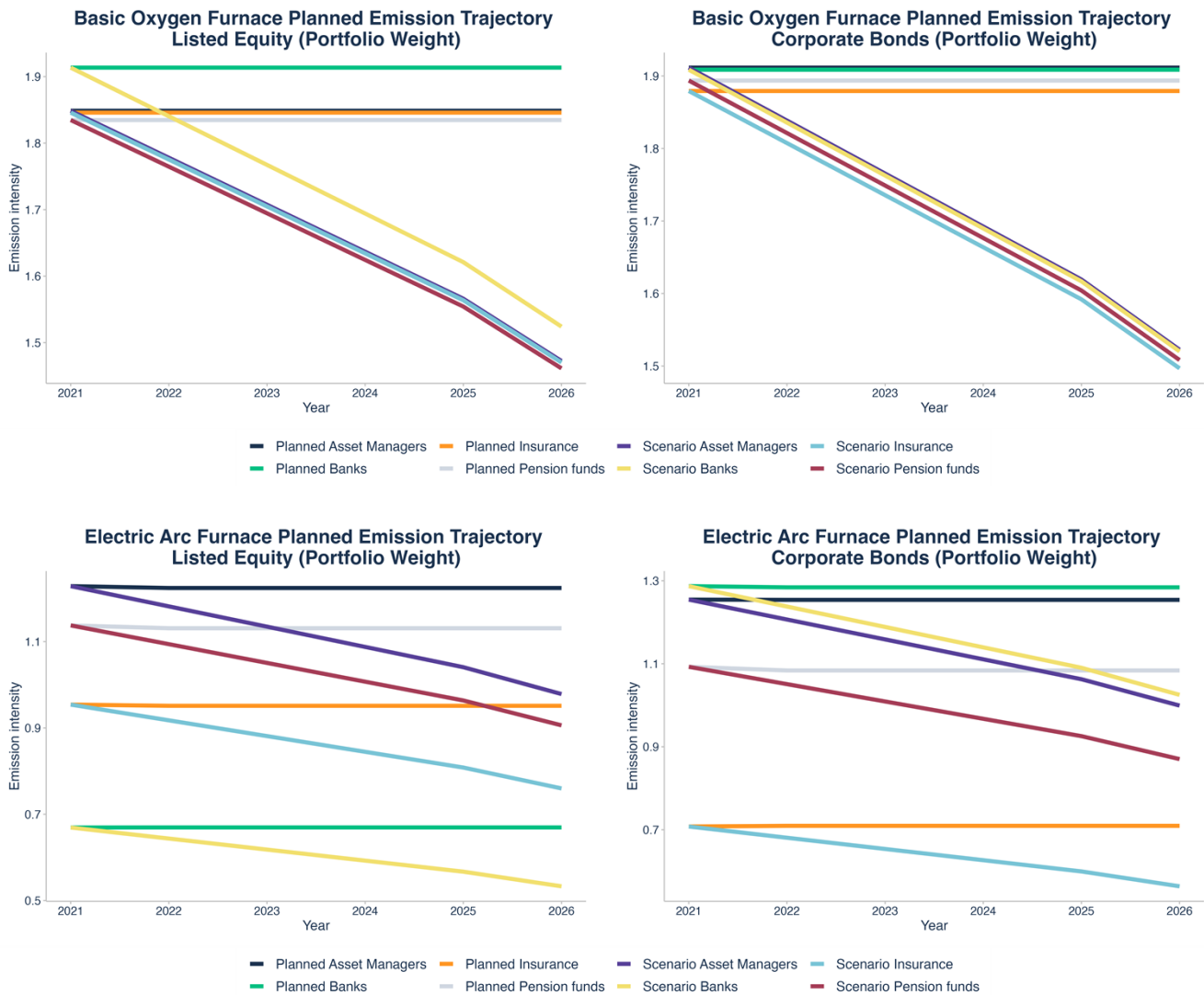


The graphs below show the current emissions intensity of the two steel production technologies most present in Swiss portfolios: Basic Oxygen Furnace and Electric Arc Furnace. Steel companies financed by Swiss listed equity and corporate bond portfolios

²⁹ Mission Possible Partnership, *Making Net Zero possible*, September 2022

will have to decrease their emission intensity by around 30% by 2026 in order to be aligned with a 1.5°C pathway in both technologies and across asset classes. Nonetheless, forward-looking CO₂ emissions and production data are more limited for the steel sector. Changes in the future emissions intensities of steel-producing companies are only currently partly forward-looking as well as being influenced by changes in asset ownership. As such, the insights that can be obtained from these graphs below are mostly on an absolute basis in relation to how far ahead (or behind) the companies in the Swiss portfolios are relative to the scenario at the present moment or, taking into account the long investment cycles for the sector, the investment required to achieve 2026 targets and beyond.

FIGURE 25: CURRENT EMISSION INTENSITY VS REDUCTION REQUIRED UNDER GECCO 1.5C SCENARIO FOR BASIC OXYGEN FURNACES AND ELECTRIC ARC FURNACES IN THE STEEL SECTOR, PER PEER GROUP.

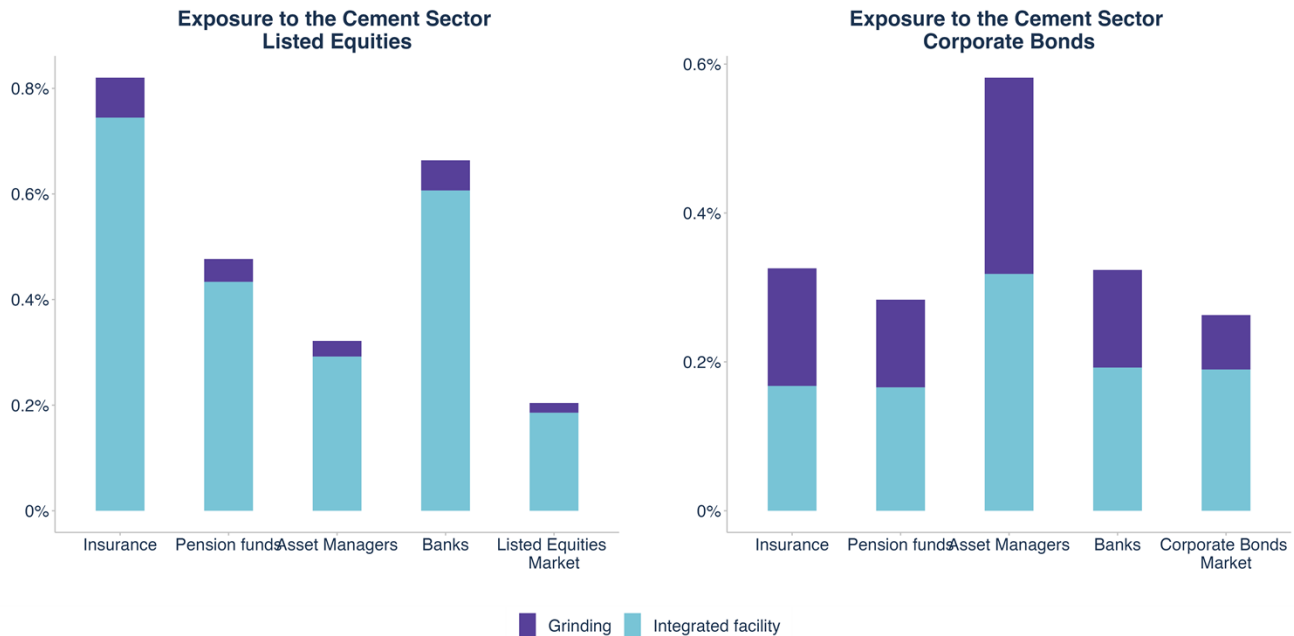


4.1.6. Cement

Cement is the second-largest industrial CO₂ emitter and the sector registers the highest emissions per revenue dollar (6.9kg CO₂/USD) among other hard-to-abate sectors, such as steel (1.4kg CO₂/USD)³⁰. Like steel, demand is driven largely by the construction sector and infrastructure projects with, in the business-as-usual scenario, demand predicted to see a moderate increase through to 2030 in response to global development. Scenarios indicate that a combination of more resource efficient construction, the substitution of clinker with alternative materials, alternative kiln energy sources and the use of carbon capture technologies will be required to decarbonize the sector. There is not one clear technology transition that can decarbonize the sector and several low-carbon solutions are yet not a commercial reality.

The sector represents less than 1% of the total portfolios of Swiss financial institutions. The exposure decreased when compared to 2020 figures (1%-2% of total portfolios). The exposure is mostly allocated to Integrated Facilities in listed equities portfolios while in corporate bonds the exposure is roughly equally divided between Integrated Facilities and Grinding facilities. The latter does not produce cement, and so is less significant in terms of CO₂ emissions, being a downstream part of the value chain that processes cement into a form ready for end markets.

FIGURE 26: SHARE OF AGGREGATE SECTOR PORTFOLIO VALUES INVESTED (EXPOSURE) IN COMPANIES ACTIVE IN THE CEMENT SECTOR, PER PEER GROUP

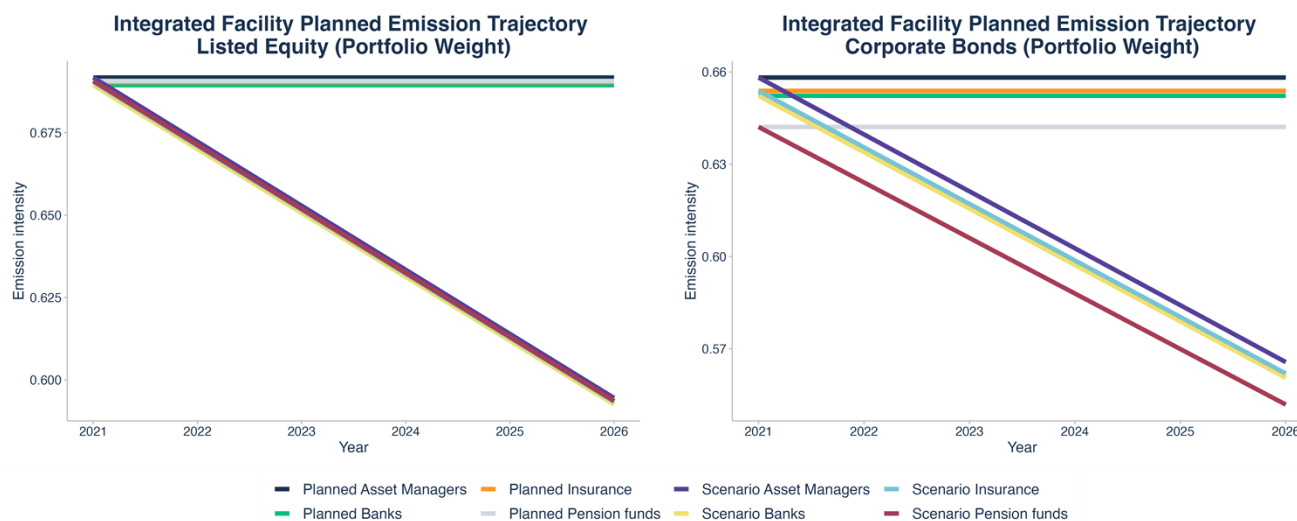


The graph below shows the current emissions intensity of the Integrated Facility technology – being responsible for the majority of the CO₂ emissions from producing

³⁰ [Strengthening Sustainability in the Cement Industry](#)

cement and the one to which Swiss financial institutions hold the largest share of exposure. Companies financed by Swiss listed equity and corporate bond portfolios will have to decrease their emission intensity by between 10% and 20% by 2026 in order to be aligned with a Net Zero pathway in both asset classes. The data on cement production currently only includes limited forward-looking aspects, so the results don't provide a complete view of investee emissions intensity by 2026 and the extent to which they are aligned with the scenario trajectory.

FIGURE 27: CURRENT EMISSION INTENSITY VS REDUCTION REQUIRED UNDER GECO 1.5C SCENARIO FOR THE INTEGRATED FACILITY TECHNOLOGY IN THE STEEL SECTOR, PER PEER GROUP



4.2. Climate evaluation of Swiss real estate and mortgage portfolios

The real estate analysis was introduced for the 2020 PACTA Climate Test. The analysis was developed by Wüest Partner in 2018/19 on behalf of the Federal Office for the Environment (FOEN). The analysis essentially seeks to assess the 'climate compatibility' of Swiss real estate and mortgage portfolios by seeking to answer the following questions:

- How high are the CO₂ emissions of the real estate and mortgage portfolios of all participants in PACTA 2022?
- How high are the CO₂ emissions from buildings of the four peer groups considered (banks, insurance companies, pension funds, asset managers)?
- How do the peer groups perform in relation to the Swiss climate targets and the federal government's defined reduction path for the building stock?

In close cooperation with the FOEN, Wüest Partner has further developed this real estate module for PACTA 2022 and, above all, adapted the reporting as far as possible on the basis of feedback. With this year's Climate Test, no change was made to the basic calculation methodology for CO₂ emissions. When entering the data required for this purpose, a machine check of the values was implemented for the first time. This and the increased efforts of the participants have contributed significantly to improving the quality of the data.

4.2.1. How the benchmark for ‘climate compatibility’ is defined

In order to determine the climate compatibility of the real estate and mortgage portfolios of the test participants, the CO₂ intensities of the tested properties are compared with the reduction path for the entire Swiss building stock according to the Federal Council’s “Long-Term Climate Strategy for Switzerland” of 27 January 2021. The net zero target for the year 2050 means that Switzerland, and thus also the Swiss building stock, should no longer emit any CO₂ in 2050. This net zero reduction path thus serves as a reference against which the climate compatibility of a property can also be measured prospectively. This benchmark specifies for each year from 2020 to 2050 how high the CO₂ intensity may still be for each building type in order to be considered ‘climate-compatible’. This reduction path is discussed in more detail in chapter “CO₂ emissions of the Swiss building stock”.

Two-time slices were chosen for PACTA 2022. The first time slice represents the analysis of the current situation, which means that 31 December 2021 is chosen as the cut-off date. The second time slice depicts the situation at the end of the drawdown path in 2050 and takes into account all remediation and replacement measures up to this point. For this purpose, the participants were able to submit their planned renovations of the building features relevant in this test: I, windows, roof, and basement. The replacement of the existing energy source for heating or hot water preparation with another – for example, by replacing oil with gas or with a non-fossil energy source – could also be entered.

The average CO₂ intensities of the portfolios of participants from the same group (peer group) are also displayed as a further comparative value for the individual participants. This shows how the portfolios position themselves relative to each other in terms of climate compatibility.

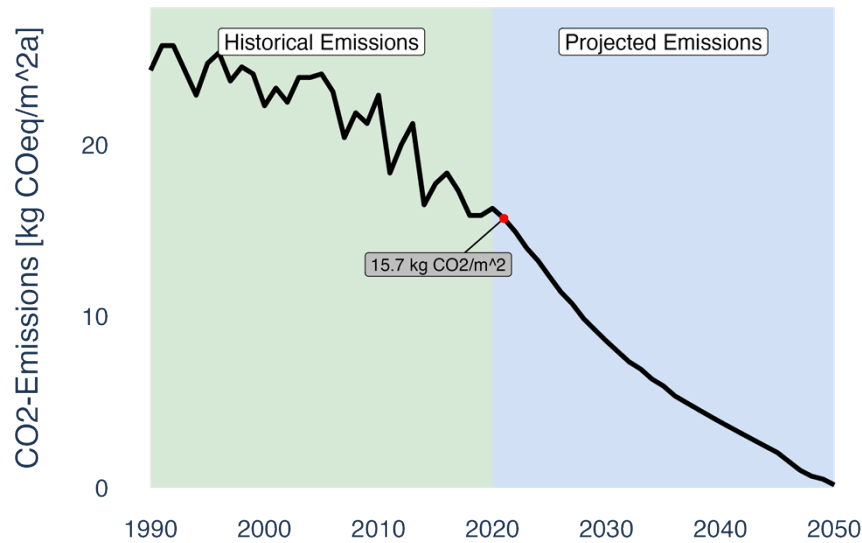
4.2.2. CO₂ emissions of the Swiss building stock

To provide some context for the test, the CO₂ emissions associated with Switzerland’s building stock are currently slightly less than a quarter of the country’s total CO₂ emissions. The proportion of buildings powered by non-fossil energy sources has been rising sharply since 2000. The use of various climate policy instruments such as the CO₂ tax on fuels, the building program, and cantonal subsidy programs have supported the reduction of emissions in recent years. In the segment of new buildings, newly constructed buildings are already largely equipped with renewable heating systems.

Emissions from fuels, adjusted for weather conditions, decreased again in 2021. Compared to 1990, these emissions were 32.8% lower, and the reduction compared to the previous year was 2.3%. This decrease is largely due to the improved energy efficiency of buildings and the increased use of non-fossil energy sources. Nevertheless, the share of renovations of existing buildings is currently too low and must be increased in the future to achieve the Federal Council declared goal of net zero in 2050. The reduction path for the Swiss building stock according to the Federal Council “Long-term Climate Strategy” 2050” of 27 January 2021 is decisive here (see Figure 28). The value marked for the year 2021 is based on

the greenhouse gas emissions of the buildings according to the greenhouse gas inventory of the FOEN "Long-term Climate Strategy of Switzerland" of 27 January 2021.

FIGURE 28: DEVELOPMENT OF CO₂ EMISSIONS FROM BUILDINGS AND REDUCTION PATH ACCORDING TO "SWITZERLAND'S LONG-TERM CLIMATE STRATEGY", THE VALUE 15.7 KG/M² REFERS TO THE YEAR 2021



Year	2020	2021	2022	2023	2030	2040	2050
CO ₂ intensity (kg CO ₂ /m ²)	16.3	15.7	14.9	14.0	8.6	3.8	0.2

4.2.3. Overall results

The aggregate results for the PACTA 2022 test are **14.8 kg/m² for directly owned buildings and 27.8 kg/m² for mortgages**. These values can be compared with the "Long-term Energy Strategy for Switzerland" in which, as was described earlier in this chapter, the average CO₂ intensity of the building stock in Switzerland should amount to 15.7 kg/m² in 2021 (cf. Figure 28). In the aggregate portfolios of directly owned buildings, the participants are positively aligned with and are in fact below the reduction path and can currently be considered climate compatible. In the case of mortgages, the aggregate portfolio is misaligned with the CO₂ intensity value by almost a factor of 2 above the reduction pathway value that defines climate compatibility.

At an individual portfolio level, there is a wide range of mean CO₂ intensities in both the segments directly held buildings and mortgages. For directly held buildings, the results range from 41 kg/m² down to 2 kg/m² (see

Figure 29) and for mortgages from 51 kg/m² down to 11 kg/m² CO₂ per energy reference floor area (see Figure 30). The results shown are benchmarked against the 2021 and 2030 values taken from the Swiss reduction pathway. No discernible pattern can be identified in regard to the different peer groups.

FIGURE 29: CO₂ INTENSITIES IN 2021 OF THE SUBMITTED PORTFOLIOS BY PEER GROUP FOR "DIRECTLY HELD BUILDINGS"

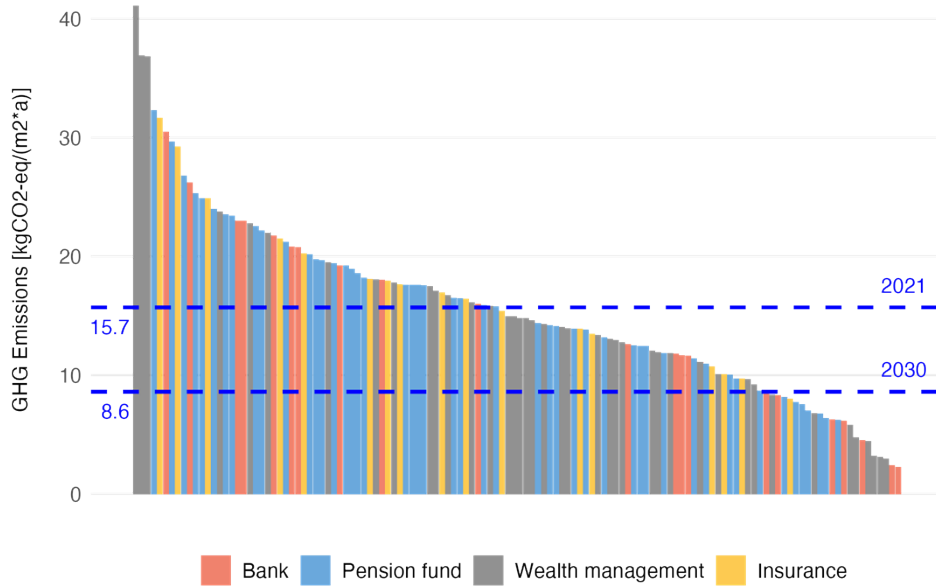
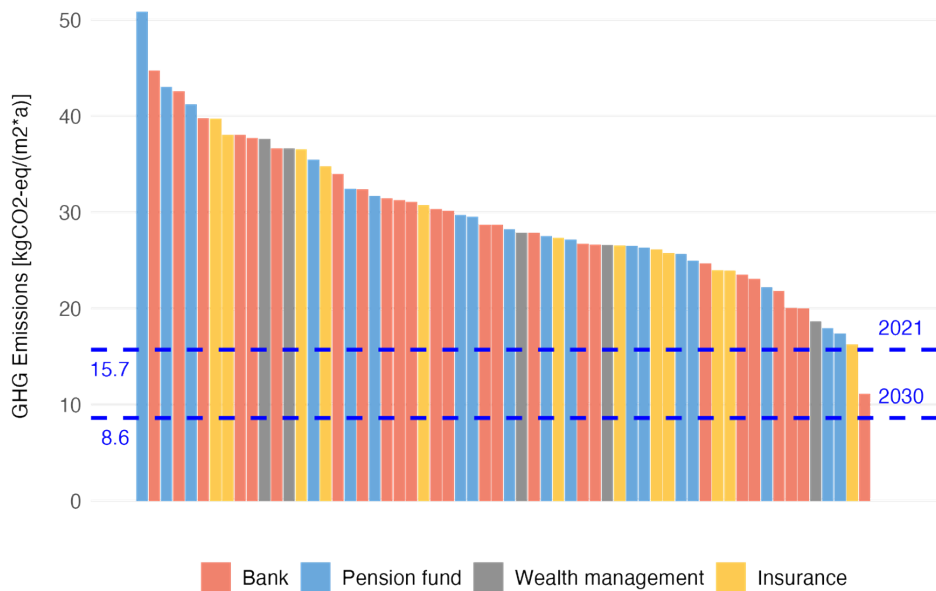


FIGURE 30: CO₂-INTENSITIES IN 2021 OF THE SUBMITTED PORTFOLIOS BY PEER GROUP FOR "MORTGAGES"



By taking into account forward-looking information provided by participants on plans and intentions for renovating buildings, a value for the CO₂ intensity of 11.8 kg/m² was achieved for directly owned buildings and 27.8 kg/m² for mortgages by 2050. In order to assess the climate compatibility of real estate and mortgage portfolios, it is relevant to look at the plans and intentions of the financial institutions. Therefore, the participants were able to enter the renovations planned for the four relevant building “roof”, “facade”, “windows” and “basement ceiling” up to the year 2050, as well as any heating replacement measures. The fact that no

changes can be observed in the case of mortgages is due to the fact that in the vast majority of cases the mortgage lenders do not have any information on the planned renovation and heating replacement measures, as they do not own the buildings.

An additional hypothetical scenario in which all four building characteristics were fully renovated was also applied to the building cases. This would result in a CO₂ intensity value of 4.2 kg/m² for directly owned buildings and 8.0 kg/m² for mortgages in order for both resulting values to reach the net zero target of 0 kg/m², all fossil energy sources would still have to be replaced by non-fossil ones. In this additional hypothetical scenario, it was examined what the situation would be if all four building characteristics relevant to the methodology, “façade”, “windows”, “roof” and “basement”, were renovated, i.e. brought up to the latest state of the art. Thus, an ideal and thus optimal scenario for the climate was examined, in which neither restrictions on finances nor on the availability of contractors are taken into account. This “full renovation” scenario is intended to illustrate the potential of renovations without a simultaneous switch to a non-fossil energy source.

4.2.4. Forward-looking results based on the planned renovations of buildings

Around half of all owners of directly owned buildings plan to carry out at least one renovation measure of the four relevant components “roof, “façade”, “windows”, or “basement ceiling” in the years up to 2050. The highest renovation values are found for the components “roof” and “windows”. All peer groups except the banks show double-digit percentages for the proportion of planned renovation measures. The effects of this can be seen in

Figure 29, where no reduction in CO₂ intensities as a result of renovations can be seen in the banks. Almost a quarter of the buildings held by the pension funds are planned to benefit from a heating replacement and over 10 percent of the buildings held by the insurance companies. The percentage level of renovation planned by each peer group by building element is presented in Table 7.

TABLE 7: PLANNED RENOVATION MEASURES BETWEEN 2022 AND 2050 FOR "DIRECTLY OWNED BUILDINGS" BY PEER GROUP

Peer group	Roof	Façade	Windows	Floor	Minimum 1 renovation	Heating system
Asset Managers	43.5%	40.8%	43.6%	6.9%	58.3%	5.7%
Banks	0.7%	0.7%	0.8%	1.7%	2.5%	0.6%
Insurance	40.1%	37.4%	38.9%	12.5%	46.7%	14.1%
Pension Funds	35.6%	31.7%	35.9%	26.5%	45.8%	23.3%

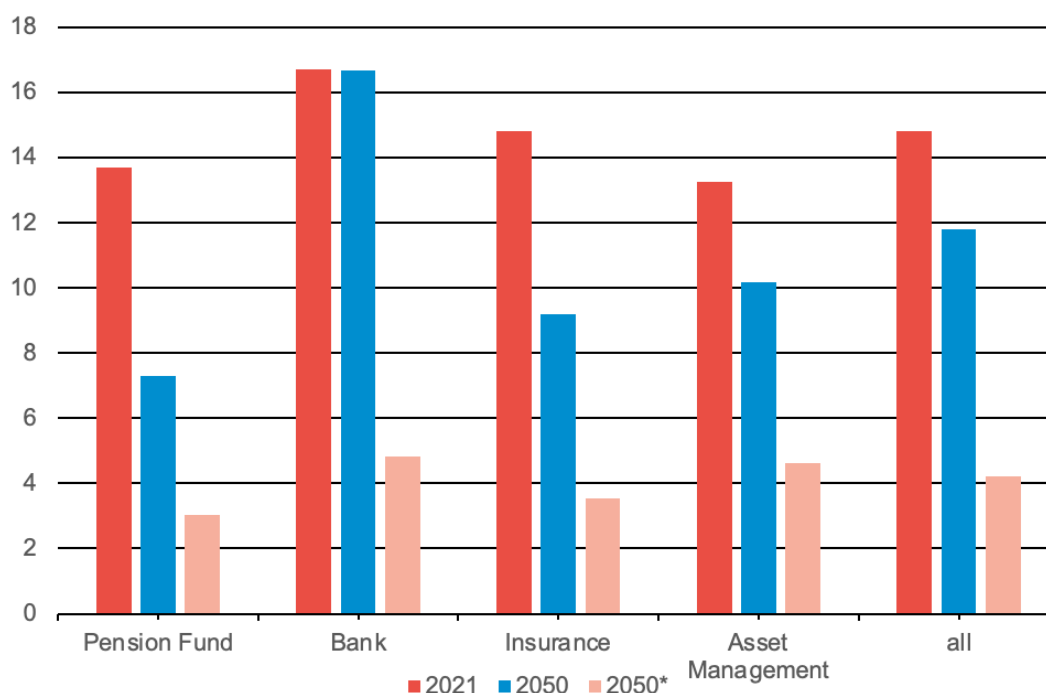
For the "Mortgages" segment, the presentation of results based on submitted renovation measures is not really meaningful, since the respective mortgage lenders do not have a sufficiently large database on these renovation measures. The owners of the respective buildings, who in the vast majority of cases are private individuals, only inform the institution of their plans - if at all - in the context of a revision or refinancing of the respective mortgage. In all sectors, the planned renovation measures for mortgages submitted are less than one in a thousand.

Returning to directly held buildings, for CO₂ intensities a reduction of 20% across all peer groups is planned (see table 13). Notably, the renovation plans submitted by the pension funds would almost halve the CO₂ intensities of their directly held assets to 7.3 kg/m² by 2050. The buildings held directly by banks have the least ambitious renovation plans, and would have the highest CO₂ intensity of all peer groups in 2050 with a value of 16.7 kg/m². Based on the renovation measures submitted by banks for analysis up to the year 2050, no reduction can be observed. In the other two peer groups, insurance, and asset management, reductions in CO₂ intensities of 5.6 and 3.1 kg/m² can be achieved with the submitted remediation measures. In the hypothetical scenario outlined above of a complete renovation (2050*) but without replacement of fossil energy sources, the CO₂ intensities drop to 3.0 to 4.8 kg/m² for all sectors (see

Figure 29).

TABLE 8: CO₂ INTENSITY BY SECTOR FOR DIRECTLY HELD BUILDINGS INCL. THE SUBMITTED REMEDIATION MEASURES AND THE HYPOTHETICAL SCENARIO OF COMPLETE REMEDIATION

Peer groups	Current performance CO ₂ [kg/m ²] 2021	Submitted plans CO ₂ [kg/m ²] 2050	Reduction pathway 2050 [kg/m ²]	Planned reduction 2050 [%]	Hypothetical renovation CO ₂ [kg/m ²] 2050
Asset Managers	13.3	10.2	3.1	23%	4.6
Banks	16.7	16.7	0.0	0%	4.8
Insurance	14.8	9.2	5.6	38%	3.6
Pension funds	13.7	7.3	6.4	47%	3.0
All participants	14.8	11.8	3.0	20%	4.2

FIGURE 31: CO₂ INTENSITY IN KG/M² REFERENCE FLOOR AREA (EBF) PER YEAR BY SECTOR FOR DIRECTLY HELD BUILDINGS

In order to be able to evaluate the validity of the results, the data quality of the parameters used must be taken into account. The data quality is found to be very good, especially in the "pension fund", "bank" and "insurance" peer groups, with values above 80%. The results for the CO₂ intensity per energy reference floor area in these sectors can therefore be considered reliable. The comparatively lower values for asset management can at best be explained by a greater professional distance to the real buildings. The buildings here are more of a purely financial investment and access to relevant building data is likely to be correspondingly more complex.

TABLE 9: DATA QUALITY BY PEER GROUP FOR DIRECTLY HELD BUILDINGS AS A SHARE OF THE ENERGY REFERENCE AREA

Peer group	Good	Medium	Moderate	n/a
Asset managers	67 %	27 %	5 %	1 %
Bank	82 %	9 %	0 %	8 %
Insurance	80 %	13 %	2 %	5 %
Pension Funds	81 %	17 %	1 %	2 %

The relatively high CO₂ intensity values for mortgages in all sectors shown in table 15 are probably overestimated. This is shown by the evaluation of the data quality, as this does not reach the same good level as for directly owned buildings (Table 10). The shares in the "good" category are higher for insurance companies than for banks, while pension funds and asset management companies have lower values. In order to determine the reasons for this

distribution, detailed clarifications would be necessary at the respective institutions. It is possible that the different entries into this field of activity and the associated different statuses of digitalization within the respective institutions could provide an explanation.

As already indicated, the higher CO₂ intensity value for mortgages is to a certain extent due to the poorer quality of the data. Since most of the participants did not provide information on the heating sources of the buildings with mortgages, this was taken from the Swiss Building and Housing Register (GWR) of the Federal Statistical Office. But even in the GWR, information on the energy source - which varies greatly from canton to canton - is only incompletely available. As a result, based on the principle of prudence, the FOEN stipulated that "oil" be used as the default energy source if the information on the existing heating source is missing both from the participant and from the GWR. Another reason is that there is a high proportion of single-family houses owned by private individuals. In this part of the building stock, there are still many oil-fired heating systems in use, which are only likely to be replaced in the coming decades. The institutional owners of directly owned buildings can more easily refinance the replacement of fossil fuels with anticipated rental income than private homeowners.

TABLE 10: CO₂ INTENSITY BY PEER GROUP FOR MORTGAGES

Sector	Current performance	Submitted plans	Hypothetical renovation
	CO ₂ [kg/m ²] 2021	CO ₂ [kg/m ²] 2050	CO ₂ [kg/m ²] 2050
Asset Managers	29.7	29.7	7.5
Banks	27.7	27.7	8.0
Insurance	30.8	30.8	9.0
Pension funds	30.3	30.3	8.6
Total	27.8	27.8	8.0

TABLE 11: DATA QUALITY BY PEER GROUP FOR MORTGAGES AS A SHARE OF ENERGY REFERENCE AREA

Sector	Good	Medium	Moderate	n/a
Asset Managers	21 %	71 %	8 %	0 %
Banks	30 %	55 %	11 %	4 %
Insurance	46 %	45 %	9 %	0 %
Pension fund	22 %	64 %	14 %	0 %

4.2.5. Results by energy source

In the PACTA 2022 test, the type of energy source (fossil or non-fossil) is the most important factor influencing the level of CO₂ intensity due to the framework condition that only Scope 1 CO₂ emissions are considered. In all peer groups and in both segments, more than two-thirds of all buildings are still operated with fossil fuel. In total, however, the share of non-fossil energy sources in directly owned buildings has increased from 25 percent to 30 percent.

Compared to the results from the PACTA 2020, a decrease in the category "oil" as an energy source can be observed in all sectors. The largest decrease, 14 percentage points, was recorded in the insurance sector. However, not all of the reduction has been substituted by the non-fossil category, as the share of "gas" has increased by 7 percentage points in the insurance peer group. In the two peer groups "banking" and "asset management" there was also an increase in the "gas" category, but at a lower level of 3 and 2 percentage points respectively. It must therefore be assumed that there has been a partial substitution of "oil" with "gas".

TABLE 12: SHARE OF ENERGY SOURCES BY PEER GROUP FOR "DIRECTLY HELD BUILDINGS"

Peer group	Oil 2022	2020	Gas 2022	2020	Other 2022	2020
Asset Managers	29 %	32 %	42 %	40 %	28 %	28 %
Banks	26 %	33 %	44 %	41 %	30 %	25 %
Insurance	23 %	37 %	48 %	41 %	29 %	22 %
Pension Funds	25 %	26%	44 %	46 %	31 %	28 %
Total	25 %	32 %	45 %	43 %	30 %	25 %

In the mortgage sector, of a total decrease of 6 percentage points in "oil" heating half of this decrease went to the category "gas". The very high values for oil for the mortgages is mainly driven by the assignment of "oil" as a default energy source if the value is unknown. No differentiation by peer group can be identified in the mortgage segment. This peer group differentiation has been newly introduced into the test in 2022, so no differences can yet be measured at the industry level. Increased efforts are being made, particularly by the banks, to ensure that these values are better recorded in their own databases. Various projects are also underway at the Federal Statistical Office in cooperation with other relevant public sector agencies to improve the data in the Swiss Building and Housing Register (GWR). For example, from 2023, the CO₂ emissions for all buildings recorded in the GWR will be calculated by the Federal Statistical Office according to the PACTA methodology. The results are available to the general public on the map viewer "map.geo.admin.ch".

TABLE 13: SHARE OF ENERGY SOURCES BY PEER GROUP FOR "MORTGAGES"

Sector	Oil 2022	2020	Gas 2022	2020	Other 2022	2020
Asset Managers	75 %	–	15 %	–	10 %	–
Banks	59 %	–	19 %	–	22 %	–
Insurance	53 %	–	26 %	–	21 %	–
Pension Funds	60 %	–	22 %	–	18 %	–
Total	60 %	66 %	19 %	16 %	21 %	18

5. Aiming higher: climate action survey results across all asset classes

Switzerland has been on the vanguard of sustainable finance, endorsing laws and initiatives – like this one – to incentivize financial institutions to promote changes in the real world through climate investment strategies. There are a variety of climate strategies that can be adopted by financial institutions: divestment, exclusion, positive screening, concessional capital, and engagement with investees, to name a few. Although evidence of the impact of such strategies is still scarce, some recent research³¹ has shown some effectiveness of investee engagement which puts it at the forefront of climate actions by many investors to improve climate alignment.

In the previous PACTA 2020 Climate Test in Switzerland, participating financial institutions reported that the climate strategies most frequently employed included engagement as well as exercising shareholder voting rights, exclusion of coal, and best-in-class investing. But it is now time to aim higher and understand how ambitious the implemented climate strategies are. This chapter is divided according to the main themes of the questions that were asked in the survey, with a focus on:

- Their overall climate strategies, goals and targets (section 5.1.)
- Their engagement with investee companies and the practices used and targets (section 5.2.)
- A cross referencing of climate goals with climate actions taken and the practices used (section 5.3.)
- Political engagement at national level (section 5.4.)

In particular, this section aims to explore the engagement actions of Swiss financial institutions and how oriented they are in terms of promoting changes in the real economy – not only in sustainability reports.

The survey was published and ran between March 2022 and July 2022. Participants answered the survey at the institutional level, representative as of 31/12/2021. The survey had a total of 33 questions divided into four sections related to their investments per asset class, climate strategies and measures, political engagement, and their participation in and learnings from the PACTA Climate Test 2020 in Switzerland. Table 15 below shows descriptive statistics about the respondents to the survey.

³¹ See [Coordinated Engagements](#) and [Active Ownership](#)

TABLE 14: TOTAL NUMBER OF RESPONDENTS TO THE SURVEY AND BY PEER GROUP

Total number of respondents .	85
Number of respondents in the peer group banks:	24
Number of respondents in the peer group asset managers:	9
Number of respondents in the peer group insurances:	12
Number of respondents in the peer group pension funds:	38
Number of respondents in the peer group other:	2

5.1. Overall climate strategies and goals

What did we ask participants about their climate strategies and goals?

In this round of the PACTA Climate Test in Switzerland we asked participants about the climate objectives of their organization. To assess the number of Swiss financial institutions with credible climate strategies we asked them:

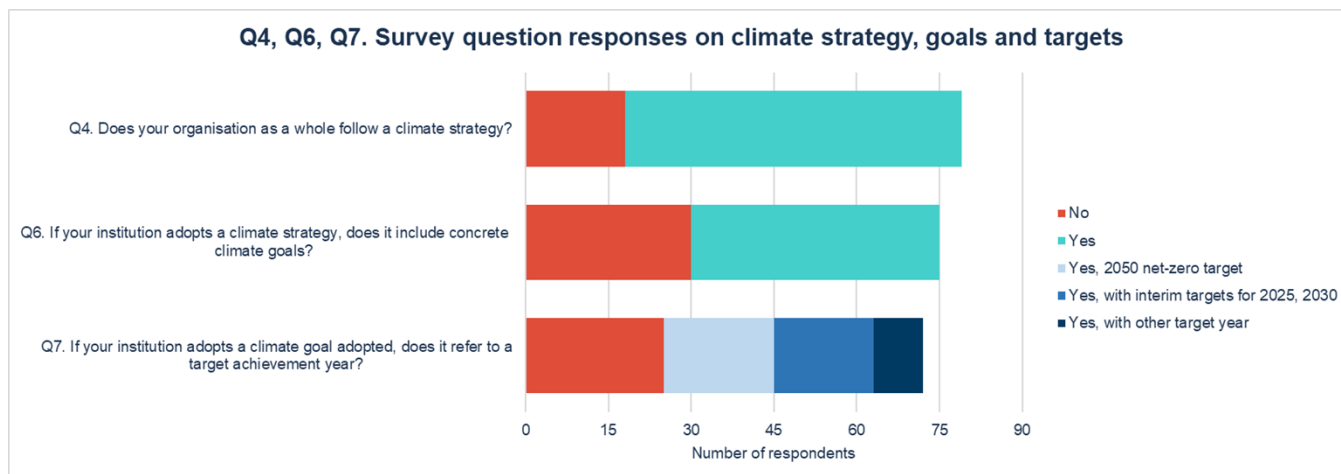
- If they follow a climate strategy (Q4)
- Whether their strategy includes concrete climate goals (Q6)
- The target achievement year of their climate goals (Q7)

They were also asked to identify climate-related initiatives and organizations to which they are members (Q10).

Setting out climate strategies and goals is an important part and the first step for financial institutions to work on their alignment with climate goals. The analysis made here was developed based on the premise that a credible climate strategy must further include (i) concrete climate goals and (ii) target achievement years to enable the institution to track its progress over time.

In total, 79 institutions reported about their climate strategy, of which 61 (77%) indicated to have a climate strategy in place (Figure 32 below). Of those with climate strategy, 45 reported also having concrete climate goals. Out of those with concrete climate goals, 38 reported having a target achievement year of either a Net Zero 2050 or an interim target year for 2025 or 2030. The figure below shows the answers to these questions.

FIGURE 32: SUMMARY OF RESPONSES TO SURVEY QUESTIONS ON CLIMATE STRATEGIES, GOALS, AND TARGETS



Regarding the target achievement year, the results show that of the 72 respondents to this question, 20 (28%) indicated having a 2050 net zero target, 18 (25%) interim targets for 2025 and 2030, and 9 (12.5%) indicated having another target year set out. In this context, it should be noted that especially short-term targets will decide whether the global economy is on track to sufficient and disruptive change or not, as long-term goals such as 2050 net zero will not suffice to limit global warming to well below 2°C.

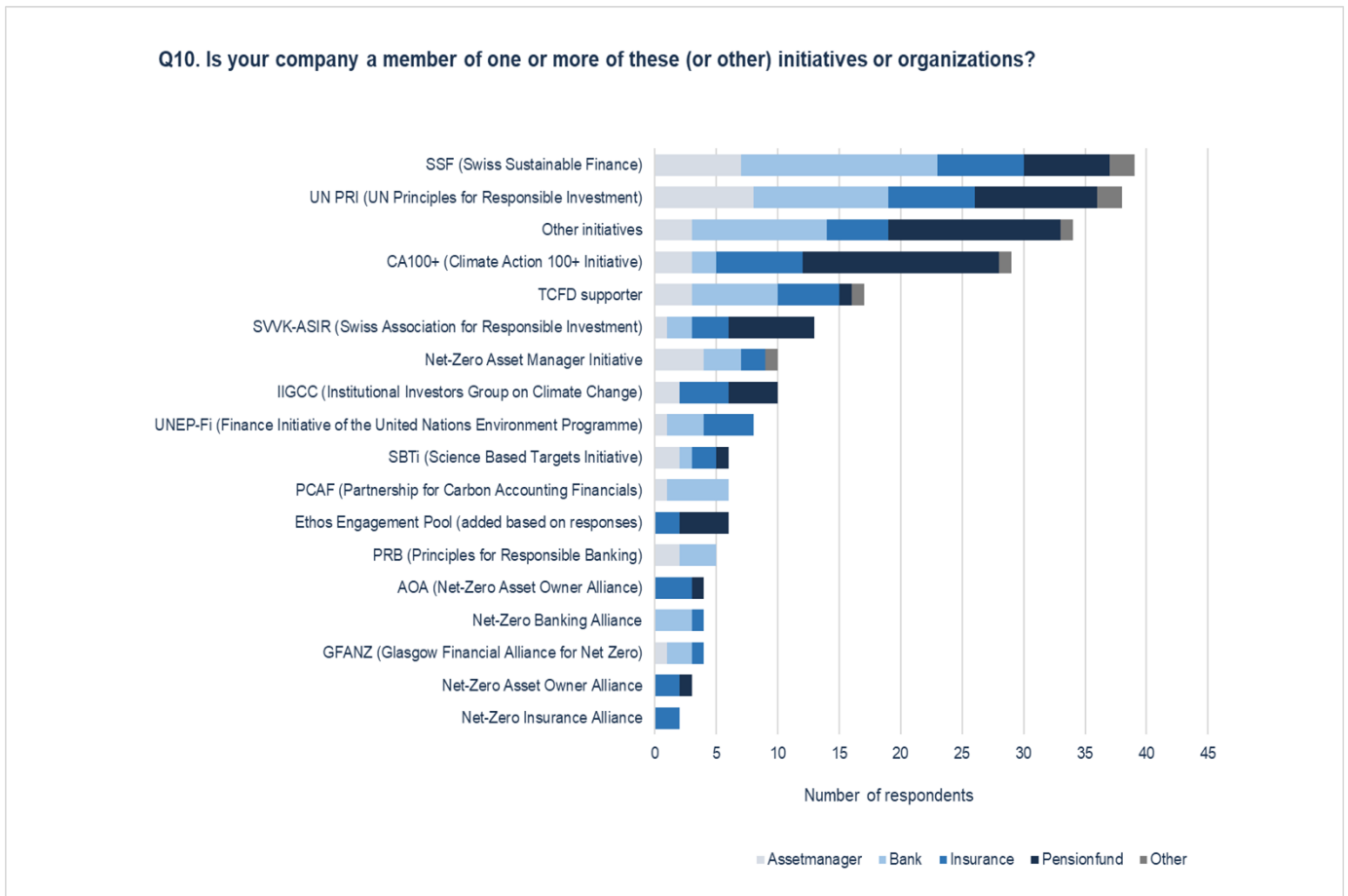
These results suggest that there is a significant share of financial institutions that have not only a climate strategy in place but also concrete climate goals, including target achievement years, as set out in the Swiss Climate Scores. On the other hand, still about one third of those with a climate strategy lacks concrete climate goals and only 38 reported having a target achievement year of either a Net Zero 2050 or an interim target year for 2025 or 2030. While this mismatch may partly be due to low response turnout about financial institutions' concrete climate goals and targets, it still shows scope for improvements in terms of setting out credible climate strategies.

Participants were also asked to identify climate-related initiatives and organizations of which they are members. These types of initiatives can be an important source of best practice and guidance for institutions, as well as being a means of sharing resources, seeking consensus on practices to use and in establishing common methodologies and processes for actions such as target setting and engagement.

The results show that the initiatives with the greatest membership amongst the respondents are, in descending order: Swiss Sustainable Finance (39 respondents), UN PRI (38 respondents) and Climate Action 100+ (29 respondents). The result for SFF is driven by banks' membership. Membership of UN PRI is relatively evenly split across participating financial institutions. The result for CA100+ is driven by pension funds, reflecting the focus of the initiative on large capitalization, institutional investment grade companies.

Notably there were 34 respondents that indicated they were members of another initiative, with these results being driven by pension funds and banks. Also notable is the relatively low membership of the different financial institution net zero initiatives, possibly reflecting the more specific commitments implied by their membership, such as target setting and a potential bias towards front runners and institutions with a greater resource and internal capacity to participate actively.

FIGURE 33: SUMMARY OF SURVEY RESPONSES ON MEMBERSHIP IN INITIATIVES, PER PEER GROUP



Summary conclusions on climate strategies and goals

- In regard to credible climate strategies, the results from this analysis suggest that there is a significant share of financial institutions that have not only a climate strategy in place but also concrete climate goals, including target achievement years, as set out in the Swiss Climate Scores, and hence follow best practice.
- On the other hand, about one-quarter of those with a climate strategy lack concrete climate goals and only about 62% set out 2050 as a net zero target year and-or interim targets for 2025 or 2030 – a time frame that is critical for action to manage the carbon budget.
- The results suggest that for a significant number of financial institutions there is scope for improvements in terms of making climate strategies more credible and tangible based on concrete goals and interim targets.
- A comparison with the 2020 survey response suggests that a larger share of financial institutions has climate strategies, targets, or aspirations in place today. However, the comparison is complicated through the fact

that the sample of institutions has partly changed and that the survey evolved over time therefore, the wording of the questions does not match perfectly.

5.2. Engagement with investee companies

Engagement is, so far, the most effective strategy that financial institutions can adopt to achieve change in the real economy. Furthermore, political engagement is seen as a complementary way to have a real-world impact by seeking to influence and change the rules of the game. In this section we analyze the survey results on engagement of Swiss financial institutions with investees (sub-section 5.2.2.) and to complement this, also provide a brief overview of scientific evidence on engagement (sub-section 5.2.1.). The aim is to provide insights into the best practices for engagement and derive learnings and recommendations for the Swiss market, based on the analysis.

What did we ask participants about engagement?

In this Climate Test we asked participants about the engagement activities of their organization. To assess the number of Swiss financial institutions with credible climate strategies we asked them:

- If they carry out engagement, as well as using active voting and exercising their voting rights across relevant asset classes (Q12)
- In the case that they do carry out engagement, or active voting, with their listed equity investments (Q14):
 - o With how many companies, by PACTA sector per year?
 - o Whether the engagements are jointly with other financial institutions
 - o Whether they carry out the engagement activities or they outsource them.
 - o If the engagement is not successful whether they then exclude companies from their investible universe.
- In the case that they carry out engagement in their total portfolio, whether they have a dedicated team and how many people are in the team (Q15).
- If they are actively position themselves in national political decision-making, including their stance on specific climate-related issues (Q23-24)

5.2.1. Investee Engagement: background and evidence for impact

Investee engagement has been found to have an impact on companies' performances both individually as well as on their peers and as enacted singularly or through joint engagement practices. It has been defined as *“the use of shareholder rights and access by investors to influence the management processes of a given portfolio company”*³². Engagement activities can range from the routine, such as voting at annual general meetings (AGMs) and

³² [Investor Engagement: Investors and Management Practice under Shareholder Value](#)

meeting with investor relations, to the activist, such as making direct requests to the board, collaborating with other investors, and seeking to change a company's management. In order to measure the impact and effectiveness of engagements it is important to focus on the causal link between the changes requested from a company and the resulting outcomes³³.

Empirical evidence for the impact of engagement can be found both in the literature on engagement to increase shareholder value and to improve the environmental performance of companies. Research focused on the EU and the US points to the following general conclusions about effective engagement ^{34,35,36}:

- **Shareholder influence:** The influence of an asset or fund manager will vary depending on the extent of the shareholdings.
- **AGM resolutions:** Proxy resolutions tend to have an advisory rather than a mandatory status, so their effectiveness and certainty of outcome vary.
- **Collective action:** By coordinating action, investors can be more effective in seeking support for policy or strategy proposals and in seeking to influence the management of companies.
- **Activism:** In general, direct, bilateral contact with companies can be more effective in seeking outcomes. Although potentially also effective, more confrontational actions, such as public statements and seeking to change the management, pose risks for both investors and investees.

The literature on engagement to improve environmental performance is more limited because of the difficulty in establishing a causal relationship between investor requests and outcomes. Nonetheless, it suggests that (i) the provision of non-financial support to companies with net-positive impact can spur the growth of climate-friendly companies and that (ii) shareholder engagement can help to accelerate incremental improvements. Engagement may not be able to transform whole industries but rather have an incremental impact on company-level improvements. The recent deployment of activist investor strategies by shareholders suggests that it may also be possible to achieve a step change in an individual company's climate strategy followed by their capital commitments³⁷.

The influence of an investor on a company increases with the assets under management and increased stakes in the target company, the cultural proximity with the company, and the size and reputation of the investor. In a recently published small-scale analysis, based on 15 selected utility companies ³⁸, the results show that the asks for companies to change their business model, audit and reform their political lobbying and establish net zero commitments are having the most impact because there is associated evidence that they lead to a material change in the company's capital expenditure^{39,40,41}.

³³ [A climate impact management system for financial institutions: designing a scientifically sounds climate contribution strategy](#)

³⁴ Ibid Martin et al (2007)

³⁵ [The director's guide to shareholder activism](#)

³⁶ [Ownership, Activism and Engagement: Institutional Investors as Active Owners](#)

³⁷ [Exxon Mobil one year later](#)

³⁸ Universal Owner, *Maximising Investor Impact: An Analysis of Climate Engagement in the Utility Sector*, April 2021.

³⁹ [Überblick zur Klimawirkung durch Massnahmen von Finanzmarktakteuren](#)

⁴⁰ [The Investor's Guide to Impact](#)

⁴¹ [Coordinated Engagements](#)

The literature discussed so far is mainly focussed on equity holdings. Engagement with issuers of corporate bonds is a relatively new area of focus for climate action, with guidance suggesting that it requires different strategies. The leverage that can be expected from bondholding is likely lower because bond holders do not have a corresponding shareholding, smaller issuer sizes and bonds have a shorter-term maturity. UN PRI guidance⁴² suggested that points of influence could include:

- Inclusion of reporting requirements in pre-issuance contractual obligations,
- Adjustment of the investors investible limit for the specific issuer,
- The potential for exposure to transition risks over different maturity time horizons could also be considered.

The first point could be addressed by identifying opportunities for more formal arrangements, such as Sustainability Linked Bonds, which are receiving increasing market attention.

5.2.2. Surveying engagement practices in Switzerland

In order to evaluate the engagement practices of Swiss financial institutions, the qualitative survey comprised questions on the general level of whether engagement is part of climate strategies applied in the investment decision-making and evaluation process. Feedback was also collected on specific engagement practices that reflect industry best practices as well as literature evidence for being effective. The analysis of all the engagement practices covered by the qualitative survey is covered in this section, and is structured as follows:

- Engagement coverage: to obtain an overview of investee engagement in the Swiss financial market, sections 5.2.2.1. and 5.2.2.2. first provides general insights into Swiss financial institutions' engagement per asset classes and sectors.
- Joint engagement: in line with the empirical evidence⁴³ of impact of coordinated engagement on environmental and social issues, section 5.2.2.3. provides insights into the prevalence of this practice.
- Combining engagement with exclusions: As a last resort and tacit threat following the escalation of engagement and a lack of response from investee companies, empirical studies have recommended combining the two practices⁴⁴. In this sense, section 5.2.2.4. provides insights into the prevalence of this practice.
- Internal resourcing: research suggests⁴⁵ that influence of an investor increases if investors have a formal process for internal staff to engage with target businesses in place. Therefore, section 5.2.2.5. provides insights into the formalization of engagement processes by capturing the share of financial institutions with dedicated engagement teams.

⁴² UN PRI guidance

⁴³ [Active Ownership](#)

⁴⁴ [Stranded Assets and the Fossil Fuel Divestment Campaign what does divestment mean for the valuation of stranded assets](#)

⁴⁵ [Coordinated Engagements](#)

5.2.2.1. *Investee and issuer engagement per asset class*

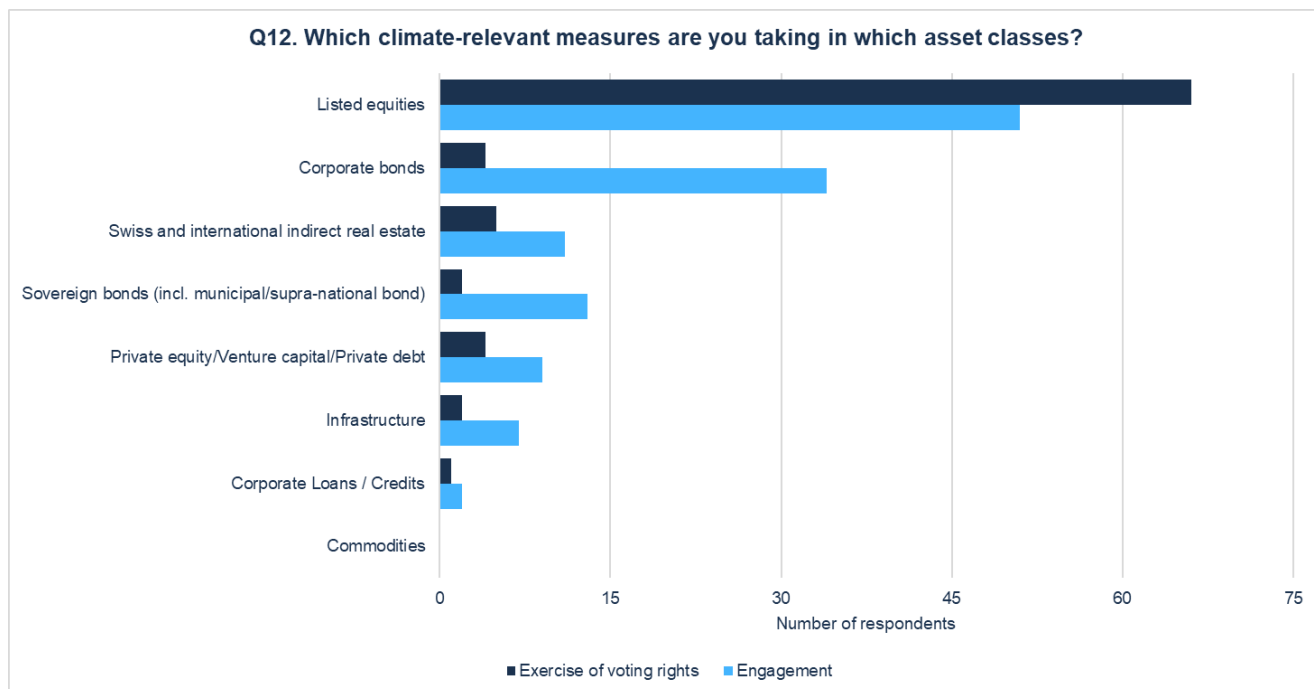
Participants were first asked to identify for which asset classes they take engagement actions as well as whether they exercise active voting and voting rights in the various asset classes. While voting rights are one of many engagement measures, the separation can help to understand better how prevalent the exercise of voting rights is for those who report engagement in general.

Out of all 85 respondents to the qualitative survey, 53 indicated to do engagement for at least one of the various asset classes (“any asset class”) which contrasts with 67 respondents indicating to exercise voting rights. The total number of participants that either take engagement actions and/or exercise voting rights is 69, suggesting that there is a large overlap between the two answers. The fact that voting rights outnumber general engagement suggests that some respondents do not interpret the exercise of voting rights as a part of engagement but rather see it as a separate measure. Nevertheless, the results strongly suggest that exercising voting rights is the most prominent way to engage with investees. It is also revealing that overall 16 financial institutions, or 19% of participants, do not appear to do any engagement, suggesting that there may be potential to promote the practice as a mechanism for influencing company performance.

Moving on to the results by asset class, most respondents focus on listed equity with their engagement (66 exercise voting rights, 51 do engagement), followed by corporate bonds for general engagement with a much lower response (34 do general engagement, 4 exercise voting rights). The high prevalence of listed equity for engagement is interesting in the context of the PACTA Climate Test Switzerland 2022, as the quantitative analysis also focuses on listed equity and corporate bonds. It may reflect a more direct influence that can be wielded by shareholders, in contrast to bonds, in which investors may only wield influence at the point of issuance⁴⁶. It is also not clear whether respondents answered yes to corporate bonds because they had sought to influence issuance via their equity shareholdings.

⁴⁶ [ESG Engagement for Fixed Income Investors: Managing Risks, Enhancing Returns](#)

FIGURE 34: SUMMARY OF SURVEY RESPONSES ON CLIMATE-RELEVANT MEASURES, PER ASSET CLASS



However, the focus on listed equity and corporate bonds raises the question as to why engagement in other asset classes is still so rare. Only 13 institutions indicate that they do engage in relation to sovereign bonds, followed by 11 for real estate, 9 for private equity and debt, 9 for infrastructure, and 2 for corporate loans. In particular, the low engagement rate for real estate with 9 out of 67 survey respondents indicated to be invested in Swiss real estate is an interesting finding as the PACTA Climate Test has included a focus on the real estate sector since 2020. This finding is striking as there is potentially a stronger and more direct influence through engagement on real estate funds which may manage directly individual property assets.

Therefore, the question arises of how Swiss real estate investors aim to improve their investee alignment performances over time. The results in 2020 suggested that investors are still lagging in the fulfillment of country-level targets. Section 4.2 shows that there is still ambitious progress required in the real estate and mortgage sector to keep up with the political ambition to decarbonize the industry and reach Net Zero by 2050. The lack of engagement actions in combination with the Net Zero country-level targets indicates that increased ambitions to take engagement actions could be a lever to improve the results in the future.

Participants were asked to indicate how many companies per sector they engage with per year in their listed equity portfolios (Question 14.1). Out of the 47 respondents, a total of 34 respondents indicated to do engagement with at least one company in at least one sector. The engagement per sector varies significantly. The sector in which respondents engaged most with companies is the fossil fuel industry (30 out of 34, or 88%), followed by power (29 or 85%), cement (27 or 79%), and steel (24 or 71%). Less than 70% of institutions indicate that they engage with companies in the automotive, aviation, or shipping industry. The results are presented in Figure 35, where the number of companies is clustered in number brackets.

5.2.2.2. *Investee and issuer engagement per sector (listed equities)*

The results also provide insights into the number of companies with which respondents engage. For most sectors (fossil fuels, power, automotive, aviation, and other sectors), the largest share of respondents engages with more than 21 companies per sector. For the two remaining sectors cement and steel, the largest share engages with 6-10 companies and 11-20 companies respectively. Across sectors, only a small share of respondents engages with less than six companies. As the size of financial institutions taking part in the Climate Test 2022 varies, the absolute number of companies only provides limited evidence on the scale of engagement. However, the results still suggest that of those financial institutions that are already taking engagement actions a significant share already does it on a larger scale. On the other hand, the share of survey participants indicating to do sector-level engagement at all is small, suggesting that the overall abundance of dedicated sector actions is relatively small.

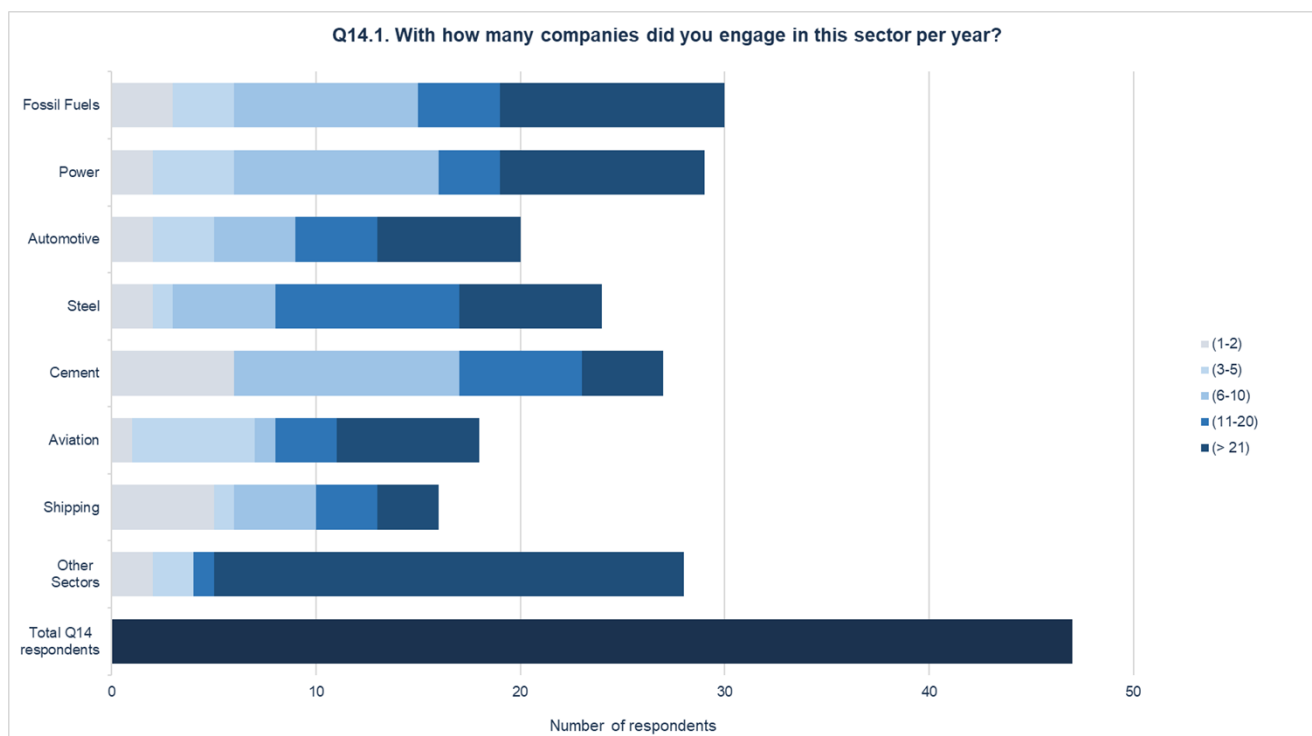
In order to evaluate how financial institutions are engaging in climate-relevant sectors, participants were asked to provide information on their engagement practices per sector in their listed equity portfolios. Out of the 85 survey participants, 47 responded to the specific engagement per sector question⁴⁷.

Participants were asked to indicate how many companies per sector they engage with per year in their listed equity portfolios (Question 14.1). Out of the 47 respondents, a total of 34 respondents indicated to do engagement with at least one company in at least one sector. The engagement per sector varies significantly. The sector in which respondents engaged most with companies is the fossil fuel industry (30 out of 34, or 88%), followed by power (29 or 85%), cement (27 or 79%), and steel (24 or 71%). Less than 70% of institutions indicate that they engage with companies in the automotive, aviation, or shipping industry. The results are presented in Figure 35, where the number of companies is clustered in number brackets.

The results also provide insights into the number of companies with which respondents engage. For most sectors (fossil fuels, power, automotive, aviation, and other sectors), the largest share of respondents engages with more than 21 companies per sector. For the two remaining sectors cement and steel, the largest share engages with 6-10 companies and 11-20 companies respectively. Across sectors, only a small share of respondents engages with less than six companies. As the size of financial institutions taking part in the Climate Test 2022 varies, the absolute number of companies only provides limited evidence on the scale of engagement. However, the results still suggest that of those financial institutions that are already taking engagement actions a significant share already does it on a larger scale. On the other hand, the share of survey participants indicating to do sector-level engagement at all is small, suggesting that the overall abundance of dedicated sector actions is relatively small.

⁴⁷ Based on question 14 of the [qualitative survey](#)

FIGURE 35: SUMMARY OF SURVEY RESPONSES ON ENGAGEMENT WITH INVESTEE COMPANIES, PER SECTOR



The results also provide insights into the depth of engagement practices per sector. The largest share of respondents indicates taking engagement actions in the sectors of fossil fuel (30) and power (29). Furthermore, in those sectors, most respondents indicate to do engagement with more than 21 companies (11 and 10 respondents, respectively). The prioritization of engagement actions in the sectors of fossil fuel and power may be a sign of the awareness of Swiss investors of the significant changes that are required in these industries to achieve the goals set out in the Paris Agreement, as well as the potential exposure to business transition risks.

After the fossil fuel and power industries, the most attention is paid to engagement practices in cement and steel, two sectors that are considered *hard-to-abate* because the current technological options to make deep cuts in emissions are not yet at a commercial scale. Interestingly, those are the sectors in which the bulk of respondents engages with less than 21 companies, i.e., with 11 to 20 (steel) and 6 to 10 (cement). There could be several reasons for this focus on fewer companies. Firstly, it may reflect that in those hard-to-abate sectors, engagement practices require more effort and co-ordination in order to have an impact, and therefore, a more focused approach is needed. Co-ordinated engagements by distinct peer groups appear to offer a way forward, with CA100+ on the investor side⁴⁸ and the recently launched steel sector Climate Finance Agreement between banks being notable examples⁴⁹. Secondly, it may reflect the structure of the two industries which is subject to strong competition with limited margins and is focused on a few large European and global players. Thirdly, it may

⁴⁸ Climate Action 100+, *Engagement process*, <https://www.climateaction100.org/approach/engagement-process/>

⁴⁹ Sustainable Steel Principles, <https://steelprinciples.org/>

be that most of the respondents are just not invested in engaging with cement and steel companies.

Interestingly, according to a discussion paper released by the UN-convened Net Zero Asset Owner Alliance⁵⁰, engagement in hard-to-abate sectors, such as steel and cement, may be frustrated by the broader market and political barriers to emissions reduction. There may therefore be an important role for collaborative engagement with other stakeholders to seek wider changes to the regulatory landscape and to support technological development.

Turning to the total number of respondents to the question, the number of those who reported doing engagement in at least one sector (34) in their listed equity portfolios (Q14) deviates significantly from the number of respondents that do engagement in listed equity (Q12). In total, 51 institutions indicated that they do engagement or 66 indicating that they exercise voting rights in listed equity. That means that 33% fewer institutions reported that they actively engage with companies in their listed equity portfolios at the sector level compared to an asset class level. Therefore, the sector-level results cannot be seen as representative of all engagement actions practiced by the respondents. Some possible reasons for the gap between the results could be that financial institutions do not necessarily have sector-specific strategies in place.

5.2.2.3. Joint engagement with other financial institutions (listed equities)

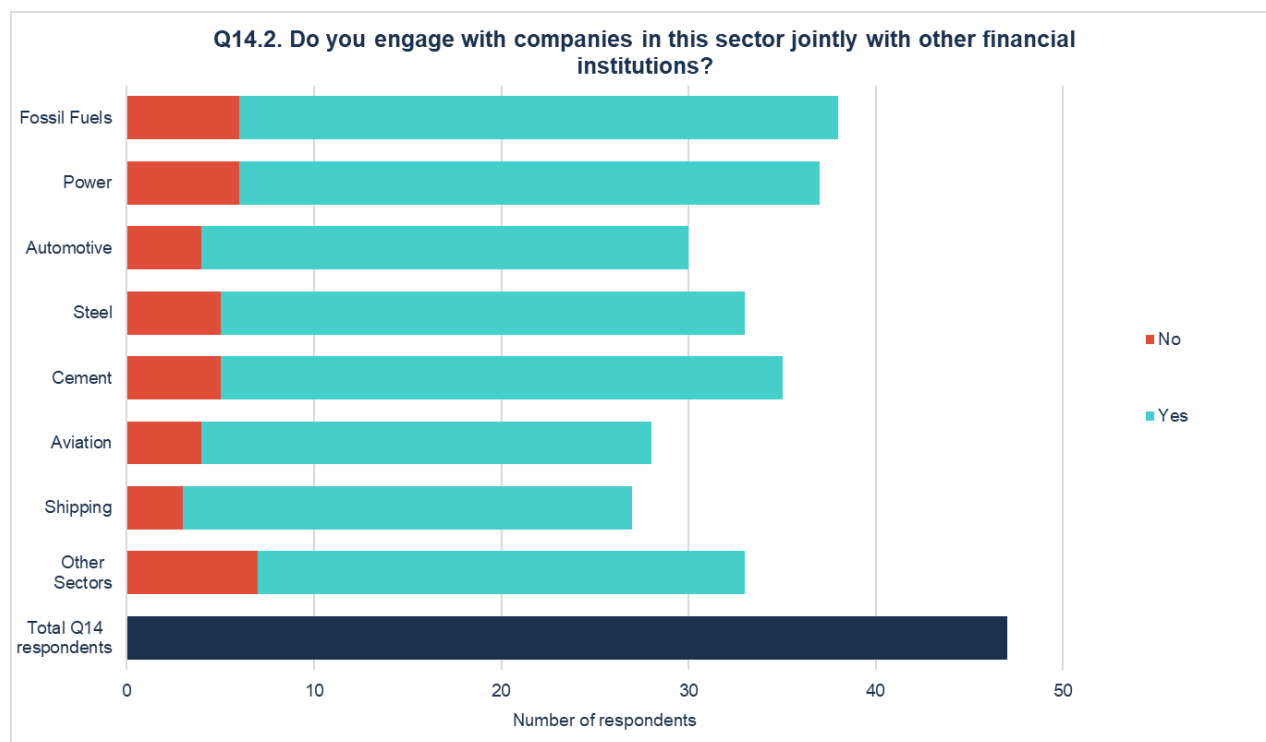
Participants were asked to indicate, with respect to listed equity, whether for each sector they engage jointly with other financial institutions, as this has the potential to amplify the potential impact. The results (figure 36) show that of the 47 respondents to question 14, a total of 33 (70%) practice joint engagement in at least one sector (“any sector”), and that the efforts vary between sectors, in a similar way to the individual engagement described in section 5.2.2.2. Of those 33 in total, 32 (97%) do joint engagement with fossil fuel companies, 31 (94%) with power companies, 30 (91%) with cement companies, and 28 (85%) with steel companies. The next sectors by the number of jointly engaging respondents are automotive (79%), aviation (73%), and shipping (73%).

Similarly, to the individual engagements by sector, the joint engagement efforts are most concentrated on fossil fuel and power companies, which mirrors the urgency to phase out and respectively decarbonize these sectors. The next two sectors in which most respondents engage jointly are cement and steel. This complements the analysis for individual engagement and shows that 70% (33 out of 47) of respondents to this question use the best practice of joint engagement for climate-critical and hard-to-abate sectors.

In general, the results on joint engagement practices suggest that among those who take engagement actions, it is a relatively common practice to also do joint engagement. The number of respondents indicating to do joint engagement even outnumbers the abundance of individual engagement per sector, suggesting that a small share of respondents only takes joint engagement actions, but not individual ones.

⁵⁰ NZAOA, 2022

FIGURE 36: SUMMARY OF SURVEY RESPONSES ON JOINT ENGAGEMENT, PER SECTOR

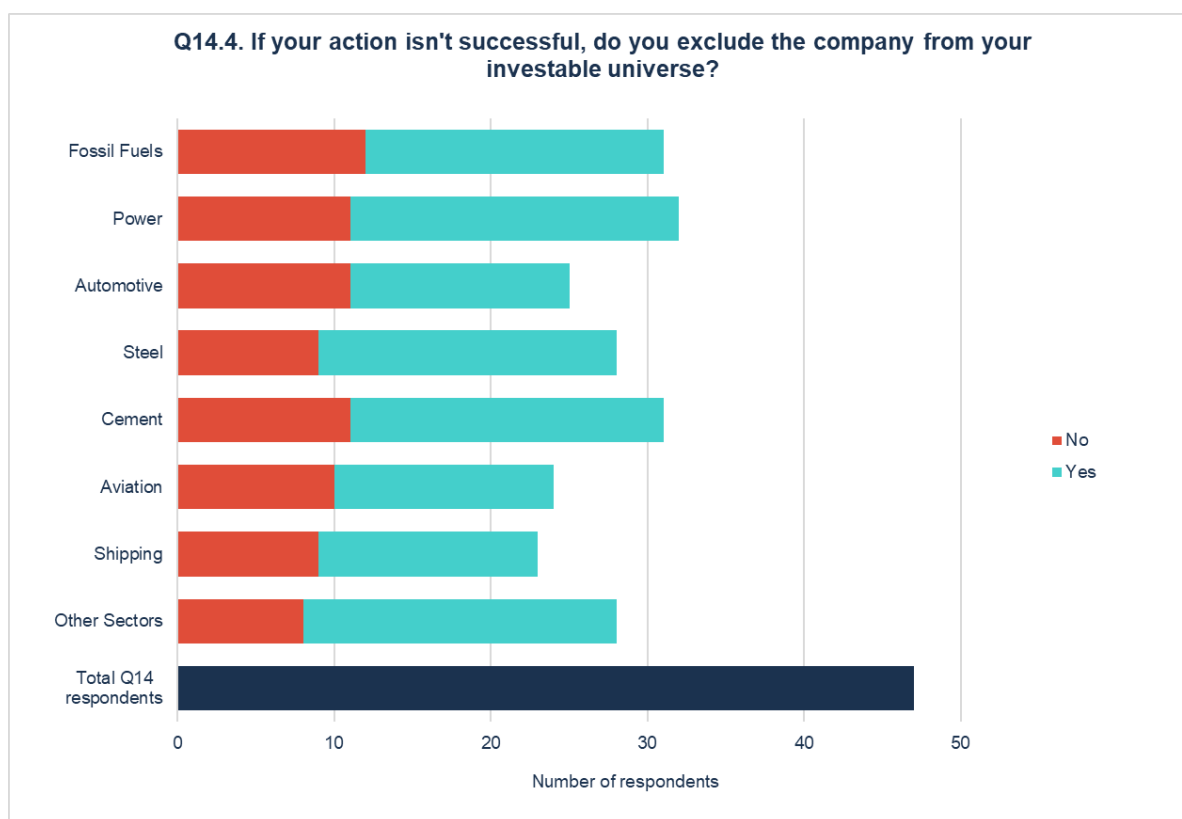


5.2.2.4. *Combining engagement with exclusions*

What happens after engagement is as important as the engagement itself because it reinforces the financial institution's goal of achieving outcomes in the real economy – and in case the investee does not respond to requests and change is not forthcoming then the investor communicates that there will be a response. In this sense, the participants were asked to indicate whether if an engagement action is not successful, they seek to exclude a company.

The results show that 24 indicated to have this exclusion practice in place in at least one sector. Looking at the results per sector, the pattern is similar to the individual and joint engagement practices. The sectors in which most respondents indicate to have such exclusion practice in place are fossil fuels, power, steel and cement. However, in most sectors the number of respondents having an exclusion practice in place is about one third or more lower than the respondents that practice joint engagement. This shows that there is scope for a significant share of Swiss financial institutions to increase the efficiency of their engagement actions by incorporating exclusion practices.

FIGURE 37: SUMMARY OF SURVEY RESPONSES ON EXCLUSION POLICIES AS ESCALATION STRATEGY, PER SECTOR



5.2.2.5. *Internal resources dedicated to engagement*

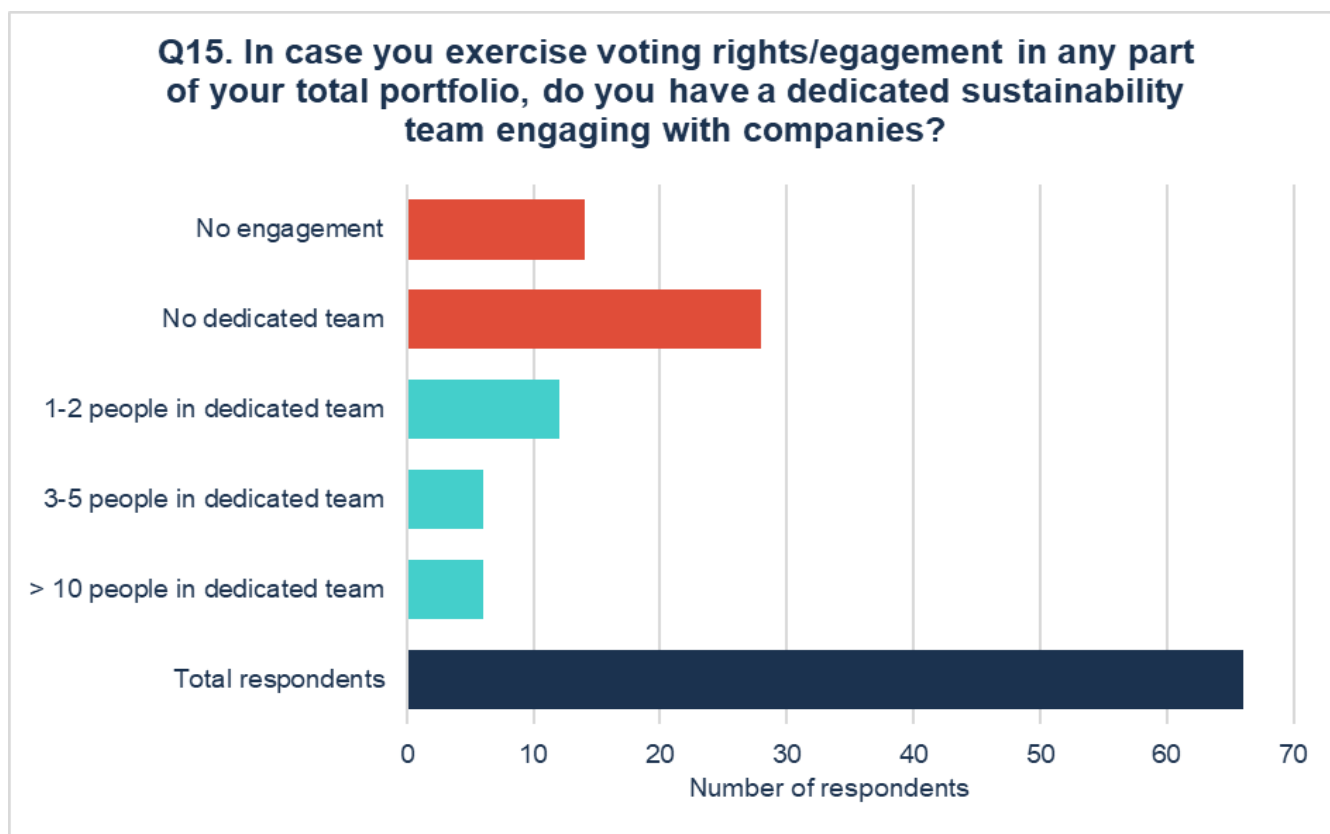
An indication of the use of more formalized, intensive and potentially impactful engagement processes is the commitment of internal resources by an investor. In the survey, participants were asked whether they have a dedicated sustainability team engaging with companies and if so, how large this team is.

In total, 66 participants responded on their commitment of internal resources to do engagement, of which 14 indicated to not do any engagement. Of the remaining 52 respondents, 28 (54%) indicated to not have a dedicated engagement team in place while 24 (46%) indicated to have a dedicated engagement team in place, of varying size. Of those with dedicated engagement teams, 50% indicated to have between one and two people in the team, and each 25% indicated to have teams of size between three to 5 and more than ten in place. No institution reported to have a team size between 5 and 10 in place.

Therefore, the results suggest that there is significant scope in the Swiss financial market to improve efficiency of engagement actions by dedicating more human resources to these processes. More than 50% of those that do engagement indicate to not have a dedicated team at all in place and half of those with dedicated teams only commit one to two people to the task.

While on the one hand it does speak for formalized engagement processes to have a dedicated engagement team in place, doing engagement by a regular team does not necessarily allow to infer the opposite. Nevertheless, having a dedicated engagement team in place can be considered as a best practice as it potentially allows for more targeting and tracking of investee companies, to benefit from accumulated experience engaging with each sector and to implement more involved escalation measures in order to obtain outcomes. Therefore, it can be considered that 36% (24 out of 66) of the respondents to this question follow the best practice, giving room for improvement in the future.

FIGURE 38: SUMMARY OF SURVEY RESPONSES ON HAVING A DEDICATED ENGAGEMENT TEAM



Summary conclusions on engagement with investee companies

- The results show that some financial institutions already follow what are considered as best practices. However, the measures adopted vary greatly across institutions. There is therefore scope for many institutions to (i) start doing engagement and/or to (ii) improve the effectiveness with which they are following best practices in engagement.
- When looking at engagements at the sector level for listed equity (question 14), both individually and jointly, the results indicate that sector engagements are taking place and that most are carried out jointly with other financial institutions. Out of 47 respondents, 34 (68%) institutions indicated that they practice engagement in at least one sector individually and 33 (70%) said they practice joint engagements. About two third of respondents engaging jointly report to exclude companies from their investable universe if their action is not successful, combining the cited benefits of both approaches.

- Most engagement efforts are put into the climate-critical sectors power and fossil fuels, followed by the hard-to-abate sectors steel and cement, suggesting awareness amongst Swiss financial institutions of the urgency to decarbonize those industries.
- In regard to internal resourcing commitments to engagements, the results show that more resourcing may be needed in order to ensure effective engagements. More than 50% of those doing engagement indicated that they do not have a dedicated team at all in place and half of those with dedicated teams only commit one to two people to the task.
- Overall these results suggest that in listed equity there is scope for more financial institutions to practice targeted sectoral engagement and to increase the potential effectiveness by following the suggested best practices. Given that only a small share of survey respondents answered the sector-level questions (47 out of 85), the number of those that could start practicing engagement or improving their effectiveness appears to be even higher.
- It is also revealing that overall, 16 financial institutions, or 19% of the total survey respondents, do not appear to practice any engagement, suggesting that there may be further potential to promote the practice as a mechanism for influencing company performance.

5.3. Cross-referencing climate goals and climate action

This section analyses the extent to which Swiss financial institutions with climate goals are also carrying out specific climate actions. Thereby, it combines the insights from section 5.1. on climate goals with those from section 5.2. on climate actions, including exclusion and engagement. This is important because the Swiss Climate Scores⁵¹ for example define that for a “credible climate stewardship” climate actions such as exercising voting rights or other engagement practices should be consistent with the ambition of reaching net zero by 2050.

5.3.1. Relating climate goals to active ownership

One would expect financial institutions with a concrete climate goal and target achievement year to also exercise active ownership in the form of engagement in general and the use of voting rights specifically in order to reach their targets. Therefore, the following analysis explores how many of the financial institutions with concrete climate goals also responded that they use various engagement measures. Figure 39 summarizes the results that are divided into measures by asset class and measure by sector.

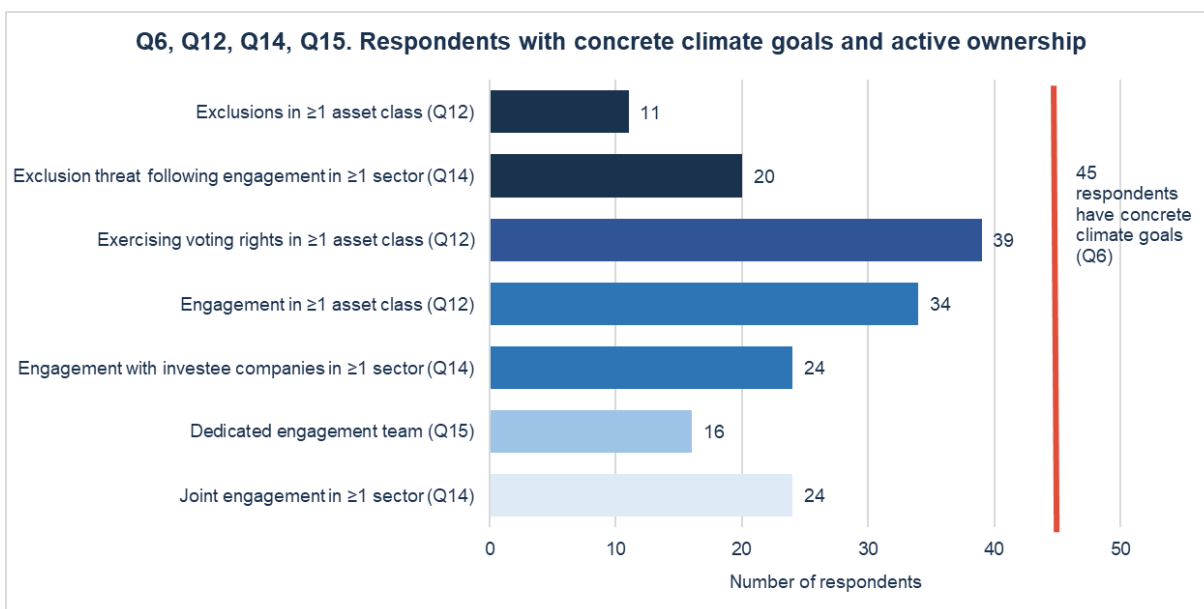
Out of the 45 respondents with concrete climate goals, 39 exercise voting rights in at least one asset class, 34 do engagement in at least one asset class and 11 have exclusion policies for at least one asset class (Figure 39 below). While the engagement-related questions were not specifically tailored towards climate-specific engagement, the results suggest that a relatively high share of financial institutions with concrete climate goals have some measures in place with which they can at least in theory seek to request climate action from their invested companies, in at least one asset class.

If we look at results per sector instead of per asset class, Figure 39 below suggests a significantly lower share of institutions with relevant measures in place. Only 24 of those

⁵¹ <https://www.sif.admin.ch/sif/en/home/swiss-climate-scores/brief-summary.html>

with concrete climate goals also indicate that they practice engagement and joint engagement in at least one sector. In theory, the results per any asset class and per any sector should be similar, which suggests that respondents either did wish to answer on engagement at the sector level or do not consider they specifically target the sectors in question. Out of the 45 institutions, only 20 institutions or 44% indicated that they exclude if engagements are not successful. This can be a measure used to put pressure on companies to engage and fulfill climate commitments. 16 out of 45 institutions have a dedicated engagement team which can be an indicator of more formalized and intensive processes.

FIGURE 39: RESPONDENTS WITH CONCRETE CLIMATE GOALS AND ENGAGEMENT ACTIONS, PER ASSET CLASS OR SECTOR



While a generalized conclusion on the share of participants that are backing up their commitments with action is not feasible to make, if one looks at engagement per sector (which may speak for more focused sector strategies as recommended by NZAOA), the results suggest that only little more than half of the institutions with concrete climate goals have engagement actions in place. Considering that already the share of respondents with concrete climate goals is 53% of all participants, this suggests that a relatively low share of Swiss financial institutions credibly backed up their commitments with actions.

5.4. Political engagement

This section evaluates the extent of political positioning by participants as this form of engagement can have an impact on the regulatory framework for financial institutions. The NZAOA, for example, calls on investors to influence the rules of the game through policy engagement, also in collaboration with other stakeholders. While at the time of the release date of this report there is no empirical evidence for the impact of policy engagement, there exists however a narrative suggesting that this mechanism could be effective, noting that it can at the

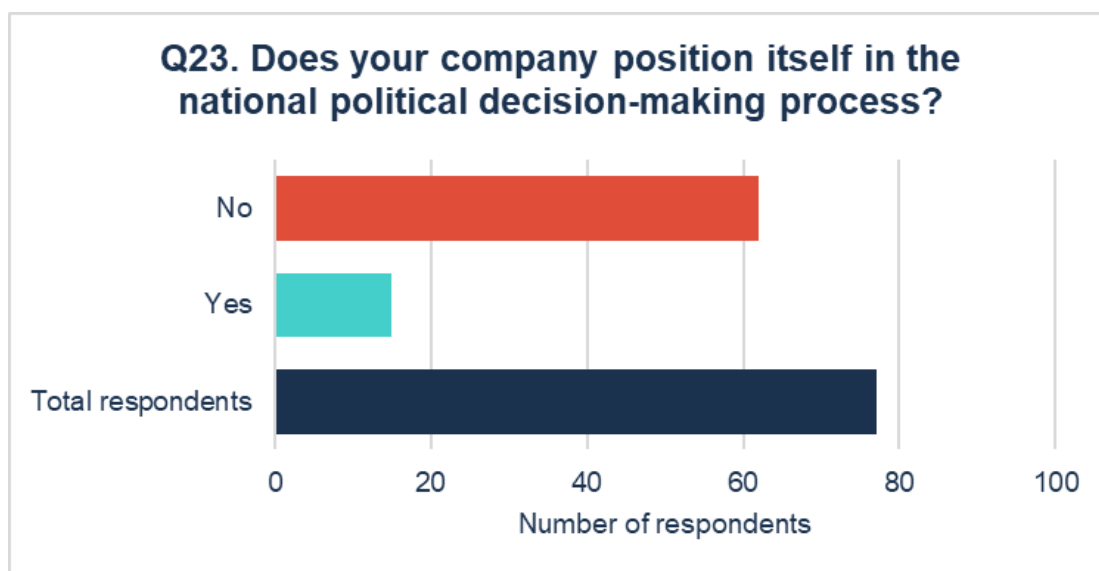
same time be used to hold back or limit more stringent regulatory requirements to address climate change.

5.4.1. Positioning on national political issues

In this part of the survey financial institutions were asked whether they position themselves in the national political decision-making process and if they do what is their stance. They were also asked how much human resourcing they dedicate to this form of engagement each year.

Out of 77 respondents in total, only 15 (19%) reported positioning themselves in the national decision-making process. This finding suggests a very low level of policy engagement in the Swiss financial market.

FIGURE 40: SUMMARY OF SURVEY RESPONSES ON POLITICAL POSITIONING

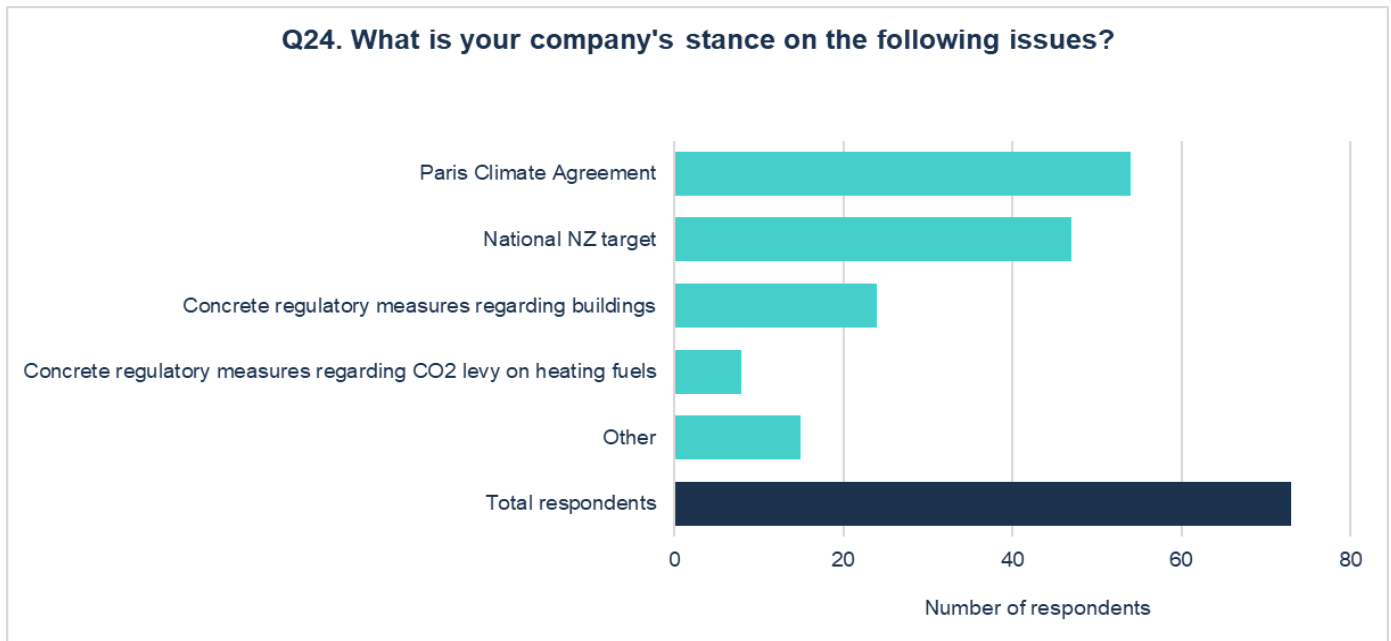


In addition to that, financial institutions were asked what their stance is on various political commitments – such as the Paris Agreement. Out of 73 respondents in total, 57 (78%) reported to at least supporting one of the political commitments. The most supported political issue is the Paris Agreement with 54 supporters, followed by the national net zero targets with 47 supporters. This also means that of the respondents 19 (26%) do not support the Paris Agreement and 38% do not support the national net zero target. Only 24 respondents support regulatory measures regarding buildings and 8 concrete regulatory measures regarding CO₂ levy on heating fuels. Considering that 59 of the survey participants also uploaded real estate and mortgage portfolios, this is a relatively low turnout of supporters for relevant policy measures.

Interestingly, overall, the results from political engagement conflict significantly with the financial institutions’ answers on their support for various political commitments. They do, however, suggest a much more politically engaged landscape in the Swiss financial market

than the question on political positioning. It is not clear why these results differ so greatly. It might be that “positioning” in the political process sounds much more formal as opposed to just “supporting” an issue, even though both things can, but do not have to, mean the same.

FIGURE 41: NUMBER OF RESPONDENTS SUPPORTING DIFFERENT POLITICAL ISSUES



Summary conclusions on political engagement

- On the political level, Swiss financial institutions seem to be hesitant to “position” themselves in the political process compared to their “support” of political issues.
- Only 15 financial institutions indicated that they positioned themselves in the national decision-making process, but 54 indicated support for the Paris Agreement.
- Notably, in contrast to the 54 that indicated support of the Paris Agreement, there were 19 respondents (26%) that do not support the agreement. This is an interesting insight considering the international character of the agreement and Switzerland’s commitments to comply with the agreement

6. Climate action in real estate: survey analysis for mortgages

Real estate is distinct from the majority of other asset classes in which Swiss financial institutions are invested, in that it consists of direct and indirect holdings in illiquid assets. Most of these assets are likely to require substantial investments in order to raise their performance in line with benchmarks for energy consumption and CO₂ emissions per square meter of useful space in line with what is anticipated by climate scenarios.

According to the respondents to Q2 on the assets in which Swiss financial institutions are invested, 79 out of 88 (90%) indicated that they are invested in Swiss real estate, 53 out of 84 (63%) in international real estate, and 49 out of 82 (60%) in Swiss mortgages. The mortgage asset class is invested in by pension funds (55%), banks (22%), and insurance undertakings (22%). For the majority of those invested in Swiss mortgages (87%) this asset class represents a low proportion of their assets under management (0-20%).

What did we ask participants about their activities around mortgages?

In this round of the PACTA Climate Test in Switzerland we focused our attention on participants invested in Swiss mortgages, and in particular on incentivizing mortgage borrowers to improve the climate performance of their properties.

We asked those financial institutions invested in this asset class two questions:

- What strategies they have adopted to incentivize mortgage borrowers to refurbish their buildings in a climate-friendly way (Q17)
- If they could provide more detailed information on climate-relevant measures they use to incentivize mortgage borrowers to refurbish their buildings in a climate-friendly way (Q18), including about:
 - o Climate/sustainability performance-based mortgage conditions
 - o Any further advisory services,
 - o Standards and definition for what counts as an 'energy-efficient mortgage'.

6.1. Incentives to encourage mortgage borrowers to make climate-friendly refurbishments

Question 17 of the survey looked at the incentives that Swiss financial institutions that are active in real estate have used to encourage mortgage borrowers to implement climate-friendly refurbishment measures. In total 21 financial institutions from the 49 that indicated in Q2 that they are invested in Swiss mortgages provided a response to this question, representing 43% of those respondents to the overall survey invested in mortgages. The majority of the respondents were banks (15), followed by pension funds (4) and insurance undertakings

(2). This response is likely to reflect those financial institutions that broker mortgage products, rather than institutions that hold asset-backed securities based on mortgages.

Although the level of owner-occupation is relatively low in Switzerland (around 24% in 2020⁵²), it still accounts for a significant proportion of the residential property. This question is important because even though institutions may have limited direct influence on mortgagees' actions to refurbish properties, they can potentially make use of incentives to encourage investment in order to raise climate performance and, at the same time, reduce the risk of them becoming stranded or impaired assets in the future. Moreover, refurbishment can contribute to improving the long-term value of property assets by improving occupier comfort and reducing running costs.

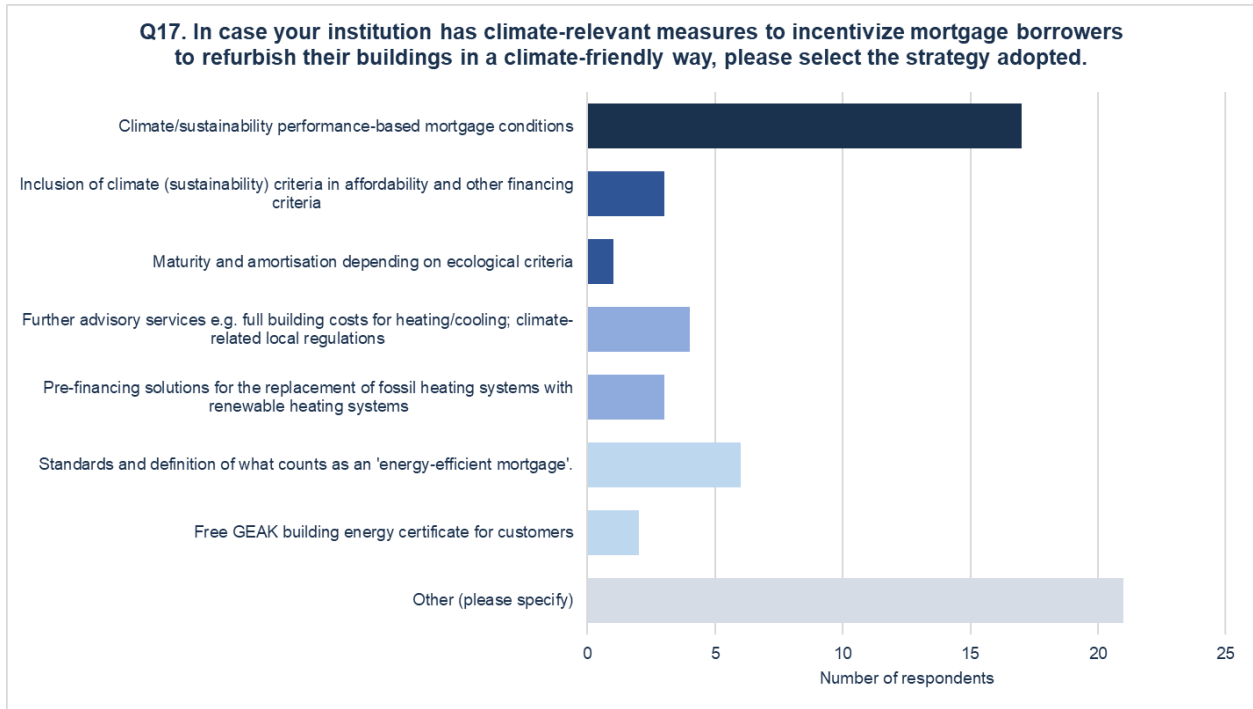
The results show that the majority of the 21 respondents either indicated that they adopted 'climate/sustainability performance-based mortgage conditions' (17) or used the open response box to specify other climate-relevant measures (18). In the case of the former, information was not however requested on the type of conditions applied or the potential impact on energy or CO₂ reductions.

The results are grouped based on their potential to be impactful. The most impactful measures are likely to be those that integrate energy and CO₂ emissions into mortgage assessment criteria and financing conditions – in this case '*climate/sustainability performance-based mortgage conditions*', '*inclusion of climate criteria in affordability and other financing criteria*' and '*maturity and amortization depending on ecological criteria*'. The large majority of respondents (17 out of 19) appear therefore to be engaged in the potentially most impactful measure.

Measures focused on mortgage criteria and conditions can then be supplemented by energy performance information (such as GEAK certifications), advisory services and pre-finance solutions in order to encourage and support the replacement of heating systems. Although overall these measures appear to be less frequent, the most selected were '*standards and definitions of what counts as an energy efficient mortgage*' (6) and '*further advisory services*' (4).

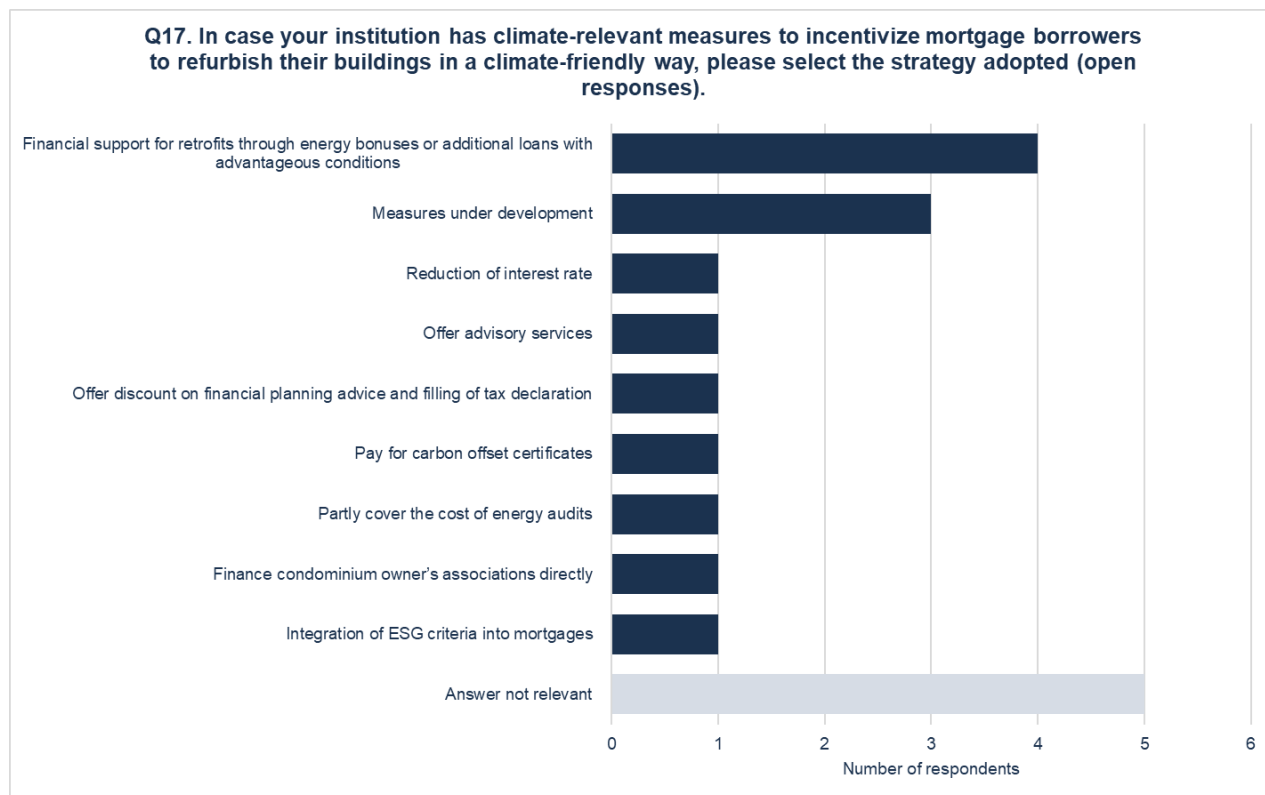
⁵² Federal Statistical Office (2022) *Building and dwelling statistics* <https://www.bfs.admin.ch/bfs/en/home/statistics/construction-housing/dwellings/housing-conditions/tenants-owners.html>

FIGURE 42: SUMMARY OF RESPONSES ON STRATEGIES TO INCENTIVIZE MORTGAGE BORROWERS TO REFURBISH THEIR BUILDINGS



The open responses provided by the 21 respondents were analyzed and grouped, with 5 rejected as not being directly relevant to the question answered. The most cited type of measure was some form of financial support for retrofit through bonuses or loans (4). Three respondents cited that they had measures under development. Seven other separate measures were cited covering a wide range of incentives.

FIGURE 43: SUMMARY OF RESPONSES ON STRATEGIES TO INCENTIVIZE MORTGAGE BORROWERS TO REFURBISH THEIR BUILDINGS (OPEN RESPONSES)



6.2. Climate-relevant measures to incentivize mortgage borrowers to refurbish their buildings in a climate-friendly way

Question 18 sought to gather more detailed information on climate-relevant measures used by Swiss financial institutions to incentivize mortgage borrowers to take action. In total 19 of the respondents to Q17 also provided a range of responses to this set of open questions. Of the three open questions posed, the number of responses received were as follows:

- If you apply climate/sustainability performance-based mortgage conditions, which conditions, for what, and in comparison, to which offers? (19 responses, of which 13 were banks)
- If you provide further advisory services, which kind is it? (10 responses)
- If you apply standards and definitions of what counts as an 'energy-efficient mortgage', which standard do you use? (14 responses, of which 13 were from banks)

The open questions have been analyzed by filtering, categorizing, and then grouping the responses provided to each question.

Looking first at open question 18.1 it can be seen that in terms of performance-based mortgage conditions, a large majority of respondents (14 out of 19) cited a reduction of

interest rates based on some form of certified sustainable construction. Several banks cited specific rate reductions including a zero-interest rate during the first 12 months of a mortgage (1 bank), as well as rate reductions of -0.5% (3 banks), -0.25% (1 bank), and -0.20% (2 banks). The two most commonly cited were the Swiss labeling schemes Minergie ⁵³, which sets requirements for very low-energy individual buildings, and 2000-Watt Society ⁵⁴, which sets low energy requirements for larger development sites. Whilst interest rate reductions could incentivize improvements, more complete information would need to be gathered on the size of the rate reductions offered and the improvement KPIs that need to be met to achieve such a reduction.

Turning to open question 18.2 on advisory services, renovation assessment tools were the most cited (4 out of 10), followed by awareness raising and free independent consultations (2 citations each). Whilst renovation assessment tools could be impactful their success is likely to be dependent on how they are deployed in consultation with financial institutions and mortgagees.

The final open question 18.3 addressed standards and definitions used for energy efficient mortgages. Similarly, to Q18.1, the Swiss low energy building labelling scheme Minergie was cited by a high number of respondents (10 out of 14), followed by GEAK energy performance certificates ⁵⁵ (9 out of 14). Other certificates and labels cited included SNBS, the ABS immobilien rating and the 2000 Watts Society. The challenge with the standards and definitions cited is to find the equivalence between them in terms of their underlying energy performance thresholds. Whilst GEAK grades performance, the mortgage provider would need to select a threshold.

⁵³ Minergie, <https://www.minergie.com/>

⁵⁴ 2000 Watt Society and 2000 Watt Site, <https://www.2000watt.swiss/english.html>

⁵⁵ Der Gebäude-energieausweis der Kantone (GEAK), <https://www.geak.ch/>

FIGURE 44: SUMMARY OF RESPONSES ON CLIMATE/SUSTAINABILITY PERFORMANCE-BASED MORTGAGE CONDITIONS (OPEN RESPONSES)

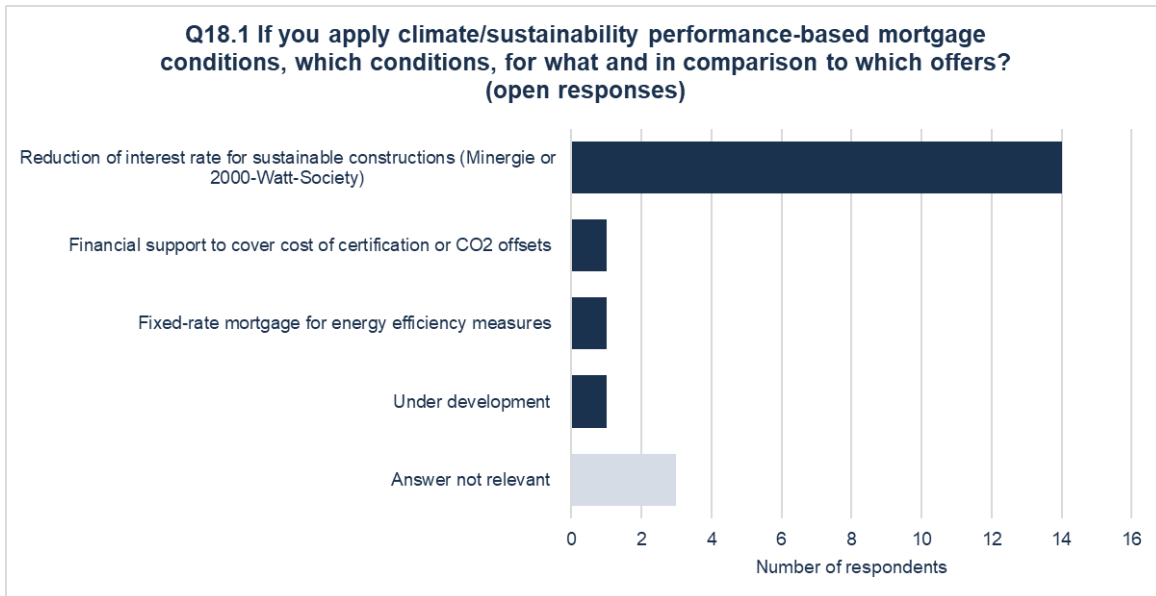


FIGURE 45: SUMMARY OF RESPONSES ON FURTHER ADVISORY SERVICES FOR REFURBISHMENT (OPEN RESPONSES)

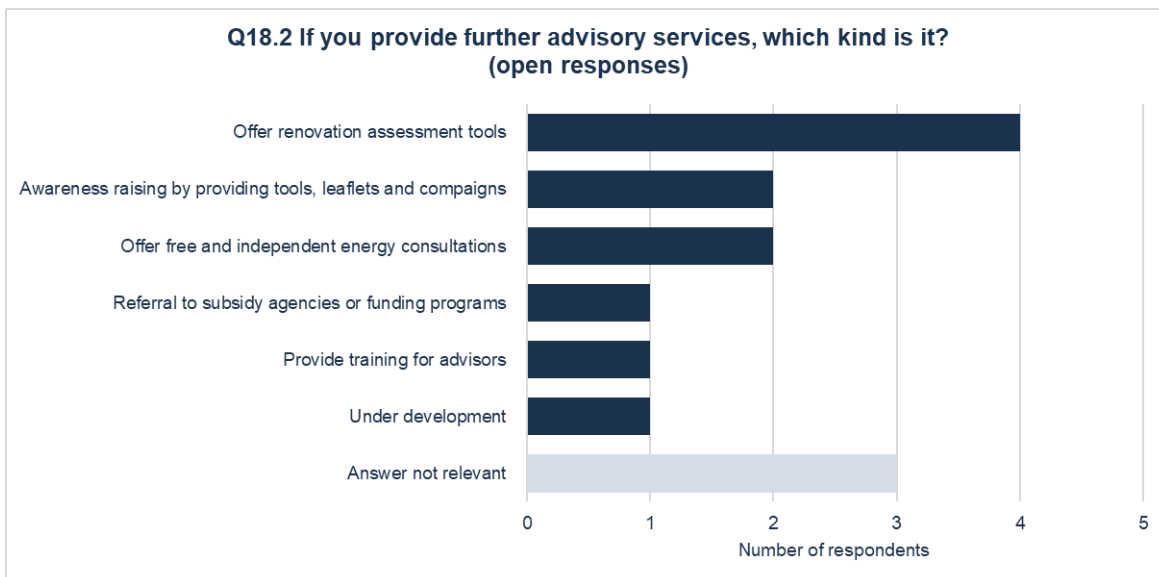
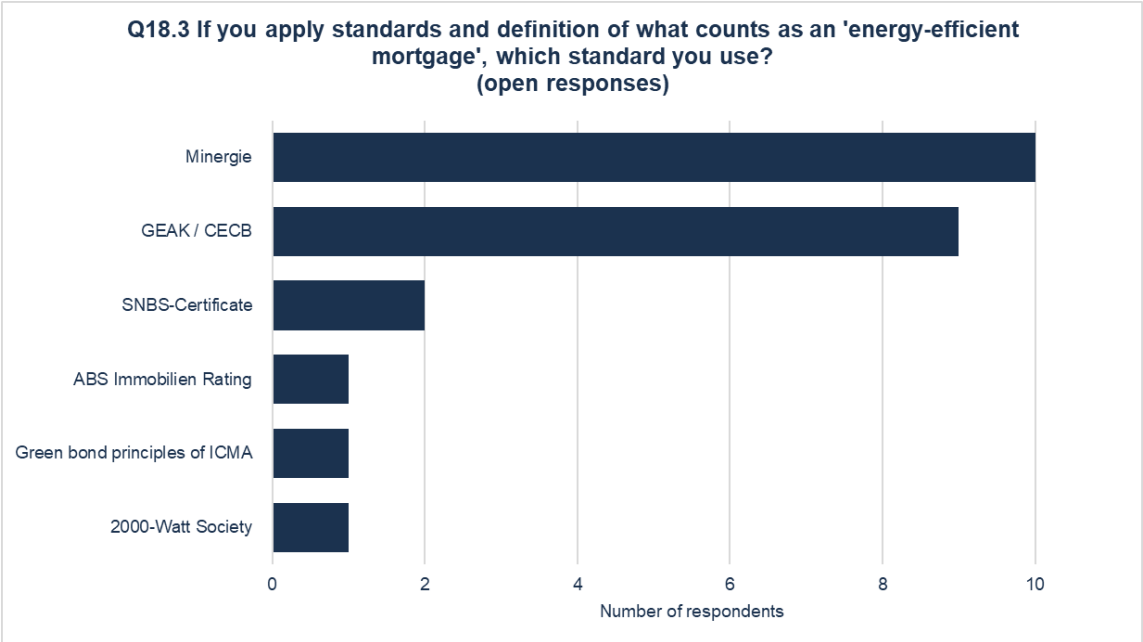


FIGURE 46: SUMMARY OF RESPONSES ON STANDARDS TO DEFINE 'ENERGY-EFFICIENT MORTGAGE'



7. Conclusion and next steps

The 2022 PACTA Climate Test is a voluntary initiative that analyzes the climate alignment and climate actions of the Swiss financial sector. All Swiss pension funds, insurance companies, banks, and asset managers were invited to participate voluntarily and free of charge in the test. The test consists of a (i) quantitative module that measures investments in listed equities and corporate bonds against global climate goals, (ii) a real-estate module that measures investments in Swiss real estate, as well as mortgage financing, against the national climate target path for the buildings sector, and (iii) a qualitative survey that aims to capture more broadly the climate actions and strategies Swiss financial institutions are undertaking.

The 2022 Climate Test builds on two successful test rounds from 2017 and 2020. The test was further developed for 2022 with the help of valuable feedback from Swiss financial institutions and associations and the support for participants was expanded. The participants receive individual, interactive reports with the results of their climate goal alignment. For each portfolio, they also receive an executive summary - greatly expanded compared to 2020 - of the most important results in English, German and French, which could be published voluntarily. In order to take into account more concrete, climate-effective measures taken by financial institutions, the qualitative survey on climate action was further expanded for the test round in 2022.

The 2022 Climate Test shows, that broad participation in meaningful monitoring can be achieved with voluntary initiative. 133 financial institutions participated in the voluntary, including pension funds, insurance companies, banks, and asset managers of various sizes. Around two-thirds also completed the qualitative survey, which captures climate-relevant measures. However, the participation of pension funds decreased significantly compared to 2020, which could indicate the limits of voluntary initiatives.

As with the previous Climate Test 2020, the real estate assets of the four main peer groups were also analyzed. In total 98 financial institutions submitted 192 real estate and/or mortgage portfolios for analysis. These portfolios comprise over 21,000 buildings directly owned by investors and over 900,000 mortgaged buildings. It is estimated that at a national level around half of all buildings held directly by institutional investors and around half of all residential buildings in Switzerland covered by mortgage portfolios were included in the test.

The analysis of climate strategies and actions show:

- **A large share of Swiss financial institutions lacks a credible climate strategy, consisting of concrete goals and interim targets.** 72% (61) of all survey respondents have a climate strategy, but only 53% (45) report having concrete climate goals in place. Only 28% (20) have set a 2050 Net zero achievement year target, and 25% (18) have interim targets for 2025 or 2030. It is especially the short-term goals and their implementation that will determine whether the global economy is sufficiently supporting the climate transition.

- **Looking at how climate targets relate to climate actions, only a fraction of about one third is following best practice.** Of those respondents with concrete climate goals (45 out of 85), 87% (39) are backing up their commitments by exercising voting rights in at least one asset class, and 53% (24) engage with investee companies in at least one sector. In regard to “best practices” for engagement, 24 (53%) exercise joint engagement on the sector level, 20 (44%) have an exclusion policy as escalation strategy in place, and 16 (36%) have a dedicated engagement team.
- **In terms of political engagement, the results show that 74% of respondents support the Paris Agreement and 62% the National Net Zero target.** In other words, one quarter of respondents does not seem to support the Paris Agreement.
- **These results show that more efforts are required to fulfill the climate targets that Switzerland committed to in the Paris Agreement.** Whether these efforts should be of a voluntary or regulatory kind, is a decision that Swiss participants and political stakeholders will likely need to answer in the near future. Until then, the recommendations in this report on a “credible climate strategy” and best practices for engagement can help to increase the real-world impact of each financial institution.

The analysis of exposures and forward-looking alignment of the financial portfolios across the eight climate-relevant sectors show:

- **Exposure to fossil fuels (coal, oil, gas) has decreased significantly, most notably among banks.** It is now rather low compared to those in Austria, Liechtenstein and Norway, which underwent similar analyses.
- **However, the fossil fuel exposures that remained in the Swiss portfolios are significantly misaligned with a net zero future.** The oil and gas production companies, which are held in particular in overall equity portfolios, plan to further expand production capacities instead of reducing them as necessary for the climate goal. For insurance companies, their oil and gas companies are planning to increase oil production almost four-fold over the next 5 years.
- **In terms of power sector exposures, the share of renewable power went up significantly in the listed equities portfolios,** now reaching around 25% for all four financial peer groups.
- **In terms of their forward-looking production alignment, things are looking rather positive for both coal power and renewable power.** The coal and renewable power listed equities portfolios are for almost all four financial sectors coming on a 1.5°C pathway over the next 5 years, with all four sectors outperforming the market.
- **However, all groups are misaligned in oil, gas, and coal mining,** sometimes performing worse than the market benchmark.

The real estate and mortgages analysis shows:

- **The aggregate results for building portfolio performance in 2021 are 14.8 kg CO₂/m² for directly owned buildings and 27.8 kg CO₂/m² for mortgaged assets.** The directly owned assets perform better than the reduction trajectory of the "Long-term Energy Strategy for Switzerland" for 2021. The results for mortgages are significantly misaligned,

but this may be overestimated because of the lack of primary data and the need to use oil as a default energy source.

- **In all peer groups more than two-thirds of all buildings are still operated with a fossil fuel.** And the share of non-fossil energy sources in directly owned buildings has only increased from 25 percent to 30 percent since 2020.
- **Whilst the underlying data quality grading for directly held buildings was graded ‘very good’, the result for mortgages were much lower,** with a grading of ‘medium’ for all peer groups except insurance, which was graded ‘good’.
- **A forward-looking assessment of portfolios was also made based on information provided about plans and intentions to renovate building assets. The results suggest a CO₂ intensity in 2050 of 11.8 kg/m² for directly owned buildings,** representing a 20% reduction, and 27.8 kg/m² for mortgages, representing no improvement.
- **The renovation plans submitted by pension funds were the most ambitious, with planned CO₂ intensity reductions of 47% by 2050,** as opposed to banks with no planned improvement registered. Overall, however, based on current renovation plans no peer group would be aligned with the net zero target for 2050 in Switzerland.
- **The limited forward-looking information on mortgaged buildings emphasizes the importance of improved data gathering** by banks, as well as incentive mechanisms to encourage renovations.
- **Incentive mechanisms were explored in two of the survey questions, with the majority of respondents indicating that they have adopted ‘climate/sustainability performance-based mortgage conditions’** as well as strategies to incentivize mortgage borrowers to take action, including in some cases adjustments of interest rates.

In the authors' view, the overall results of the Swiss Climate Test 2022 show an increasing number of good examples of an effective, credible climate impact in the real economy. Nonetheless, with a global warming of 1.5°C at serious risk, it is time to *aim higher* and move away from reducing emissions only in portfolios to reduce emissions in the real economy. For the entire financial flows to be aligned with the 2050 climate goals, ambitious climate targets and concrete, climate-effective measures would have to be implemented by more financial institutions and more stringently.

The regular Climate Tests ideally support the implementation of recommendations of the Swiss Federal Council. In order to keep test participation attractive not only from an overall market perspective but also from an individual institution perspective, RMI and FOEN work towards offering additional innovations in each test round. The next coordinated Climate Test in Switzerland is scheduled for 2024.

Switzerland's experience can hopefully contribute to further convergence and coordination in the international sustainable finance community, as it is the first country to initiate a coordinated PACTA project (PACTA COP) for its financial market actors for the third time. With the integration of real estate and mortgage analysis, Switzerland also offers the most comprehensive climate test. To the best of our knowledge, coordinated PACTA projects are the only analyses worldwide that enable comparable results across different financial sectors because they use uniform methodology and data.

Bibliography

- Keramidas, K. F.-M. (2021). *Global Energy and Climate Outlook 2021: Advancing towards climate neutrality*. Luxembourg: Publications Office of the European Union.
- International Energy Agency. (2021). *World Energy Outlook 2021*. Paris: International Energy Agency.
- Network for Greening the Financial System. (2022). *Not too late - Confronting the growing odds of a late and disorderly transition*. Network for Greening the Financial System.
- Die Bundesversammlung — Das Schweizer Parlament. (2021, October 12). *Indirekter Gegenentwurf zur Gletscher-Initiative. Netto-Null-Treibhausgasemissionen bis 2050*. Retrieved from <https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20210501>
- The Federal Council. (2022, March 30). *Federal Council initiates consultation on ordinance on climate reporting by large companies*. Retrieved from <https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-87790.html>
- Swiss Bankers Association (SBA). (2022, April 26). *Net zero alliances: an essential tool for supporting climate goals*. Retrieved from <https://www.swissbanking.ch/en/news-and-positions/opinions/net-zero-alliances-an-essential-tool-for-supporting-climate-goals>
- United Nations Climate Change. (2015). *The Paris Agreement*. Retrieved from <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
- TCFD, Portfolio Alignment Team. (2021). *Measuring Portfolio Alignment*. Task Force on Financial Disclosures.
- Global Sustainable Investment Alliance. (2021). *Global Sustainable Investment Review 2020*. Global Sustainable Investment Alliance.
- Morningstar. (2022). *Investing in Times of Climate Change 2022*. Chicago: Morningstar Manager Research Services.
- Kölbel, J., Heeb, F., Paetzold, F., & Busch, T. (2020). Can Sustainable Investing Save the World? Reviewing the Mechanisms of Investor Impact. *Organization & Environment*.
- Ralite, S., Hagedorn, K., & Ghirardi, T. (2022). *A Climate Impact Management System for Financial Institutions*. Paris: 2° Investing Initiative.
- Dimson, E., Karakaş, O., & Li, X. (2021). Coordinated Engagements. *European Corporate Governance Institute - Finance Working Paper*.
- Dimson, E., Karakaş, O., & Li, X. (2015). Active ownership. *The Review of Financial Studies*, 3225–3268.
- Martin, R., Casson, P., & Nisar, T. (2007). Investor Engagement: Investors and Management Practice under Shareholder Value. *Oxford University Press*.
- Moats, M., DeNicola, P., & Malone, L. (2021, June 11). *The Director's Guide to Shareholder Activism*. Retrieved from Harvard Law School Forum on Corporate Governance: <https://corpgov.law.harvard.edu/2021/06/11/the-directors-guide-to-shareholder-activism/>

- McNulty, T., & Nordberg, D. (2016). Ownership, Activism and Engagement: Institutional Investors as Active Owners. *Corporate Governance An International Review*, 346-358.
- Engine No. 1. (2022, May 25). *ExxonMobil: One Year Later*. Retrieved from <https://engine1.com/transforming/articles/exxon-mobil-one-year-later/>
- Kaiser, L., & Oehri, O. (2020). *Überblick zur Klimawirkung durch Massnahmen von Finanzmarktakteuren*. Center for Social and Sustainable Products AG.
- Heeb, F., & Kölbel, J. (2020). *The Investor's Guide to Impact*. Zurich: Center for Sustainable Finance & Private Wealth.
- Quigley, E. (2020). Universal Ownership in Practice: A Practical Investment Framework for Asset Owners. *Winner of Best Paper for Potential Impact on Sustainable Finance Practices*.
- Ansar, A., Caldecott, B., & Tilbury, J. (2013). *Stranded assets and the fossil fuel divestment campaign: what does divestment mean for the valuation of fossil fuel assets?* Oxford: Smith School of Enterprise and Environment.
- Principles for Fixed Income Investors. (2018). *ESG Engagement fo Fixed Income Investors*. UNEP-FI.
- Koliai, S., Pacheco, D., Vleeschhouwer, M., Vogt, A., & Thomä, J. (2022). *Tracking real world emission reductions: The missing netelement zero targetin portfolio alignment and setting approaches*. Berlin: 2° Investing Initiative.
- IRENA and CPI. (2020). *Global Landscape of Renewable Energy Finance*. Abu Dhabi: International Renewable Energy Agency.
- Bloomberg. (2022, July 6). *EU Lawmakers Remove Last Hurdle to Label Gas, Nuclear as Green*. Retrieved from <https://www.bloomberg.com/news/articles/2022-07-06/eu-lawmakers-remove-last-hurdle-for-gas-nuclear-as-green?leadSource=verify%20wall>
- PwC. (2022, November 13). *Striking a balance between legislative requirements and consumer expectations*. Retrieved from <https://www.pwc.de/en/sustainability/sustainability-in-the-automotive-industry.html>
- IFC Manufacturing, Agribusiness & Services. (2020). *Strengthening Sustainability in the Cement Industry*. Washington DC: International Finance Corporation.
- Climate Action 100+. (2022). *Engagement process*. Retrieved from <https://www.climateaction100.org/approach/engagement-process/>
- RMI. (2022). Retrieved from Sustainbale Steel Principles: <https://steelprinciples.org/>
- Barnet, J., & Peura, P. (2022). *The Future of Investor Engagement: a call for systematic stewardship to address systemic climate risk*. Net Zero Asset Owner Alliance (NZAOA).
- State Secretariat for Sustainable Finance. (2022). *Swiss Climate Scores*. Retrieved from <https://www.sif.admin.ch/sif/en/home/swiss-climate-scores/brief-summary.html>
- Swiss Federal Statistical Office. (2022). *Building and dwelling statistics*. Retrieved from <https://www.bfs.admin.ch/bfs/en/home/statistics/construction-housing/dwellings/housing-conditions/tenants-owners.html>

Annex I: the PACTA Methodology

General considerations

The PACTA Methodology consists of several components. The quantitative part of it compares what needs to happen in sectoral decarbonization pathways determined through climate scenarios, with financial actors' exposures to companies in climate-relevant sectors. To do so, PACTA provides a five-year forward-looking, bottom-up analysis. It looks at the investment and production plans of companies, based on physical Asset-Based Company Level Data (ABCD), and consolidates that information to identify the transition profile of the companies and their related financial instruments. That way, PACTA can aggregate the production data to the portfolio level and compare that information to the production plans projected in different climate scenarios. The (mis-) alignment between the portfolio and these scenarios allows users to infer the potential exposure to transition risks and opportunities.

In total, the PACTA Climate Test Switzerland 2022 analysis consists of 4 components that aim to answer the following questions:

- **Exposure Analysis.** What is the current exposure of the portfolio to the economic activities that are most affected by the transition to a low-carbon economy?
- **Future Exposure Analysis.** How will the exposure of the portfolio change in the next five years, and how does it compare to a portfolio that is aligned with the Paris Agreement?
- **Scenario Analysis.** How aligned are the investment and production plans of companies in the portfolio with different climate scenarios and the Paris Agreement?
- **Climate Action.** How ambitious are the financial institution's climate strategies and how do they compare quantitative climate goal alignment indicators?

Further information on the methodology applied to answer those questions will be provided in the following sub-sections which will elaborate on the coverage, data inputs, allocation methods, pacta metrics, and climate action analysis.

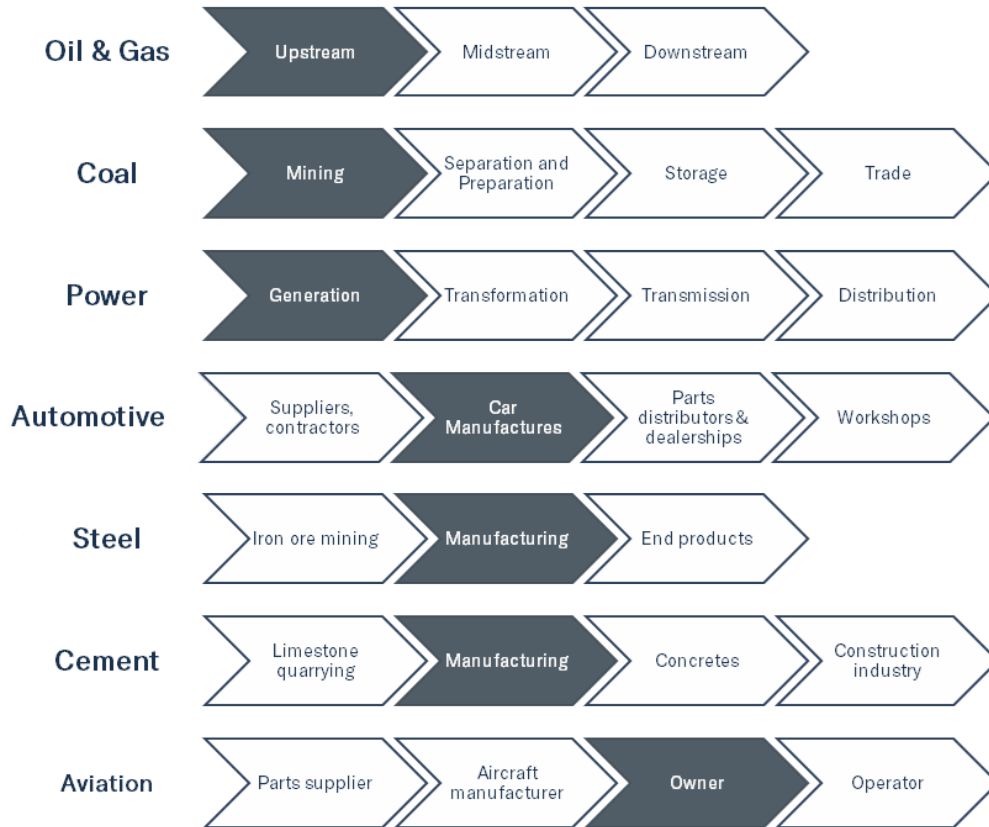
Coverage

Asset classes covered

The PACTA Methodology covers listed equity and corporate bond portfolios. The selection of asset classes covered by the methodology responds to the key role corporate issuers have in the transition to the low-carbon economy and the flexibility investors have to carry out different actions that allow mitigation of portfolio-level climate-related risks and risks in the real economy. PACTA further not only covers single titles but also funds. A fund look-through was applied automatically. However, to increase coverage, PACTA recommended users to do the look-through themselves if they were not satisfied with the coverage of the automated procedure.

Sectors covered

The PACTA methodology covers eight of the most carbon-intensive sectors in the economy (i.e., the sectors most exposed to transition risks) – oil, gas, coal, power, automotive, cement, aviation, and steel (the "PACTA sectors"). Together, they are responsible around 70% of the global CO₂ emissions⁵⁶. In each sector, PACTA focuses on the part of their value chain with the highest contribution in terms of 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 the segments of the value chain see the figure below.



Data inputs

Portfolio data

To run the portfolio assessment, participants provide an input file containing security information for each portfolio to be analyzed. It includes the following information:

- Investor and portfolio names

⁵⁶ Based on 2019 Greenhouse Gas emissions data taken from the IEA (2021) and IPCC (2021), the PACTA sectors — power, automotive, steel, cement, and aviation — account for just under 70% of the global CO₂ emissions and approximately 42% of the global GHG emissions. Fossil fuel production for all sectors of the economy, including the PACTA sectors, accounted for approximately 63% of the global GHG emissions in 2019.

- One ISIN per listed instrument (funds are identified by their ISIN. Securities in each fund are included in the analysis)
- The market value of the financial assets held in the portfolio
- The currency code corresponding to the market value
- A timestamp of the portfolio

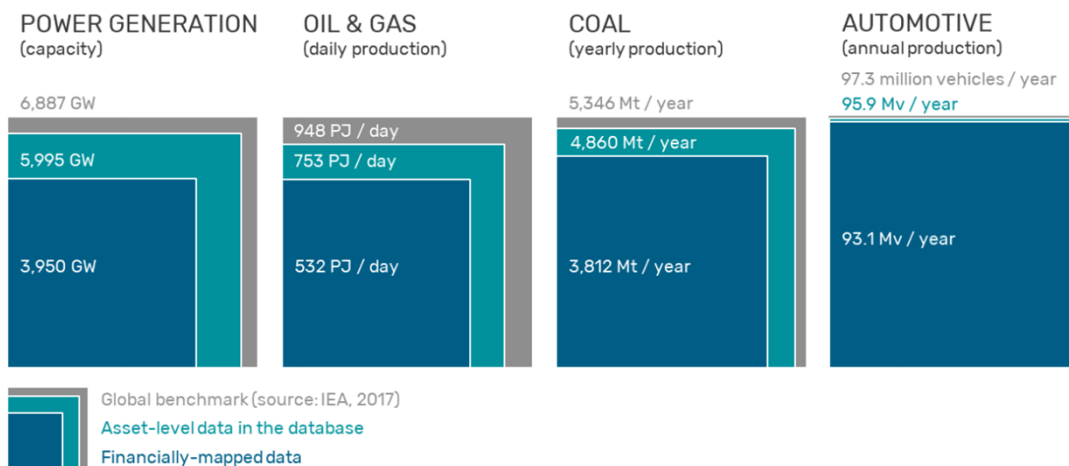
Financial data

Financial data is used to assign securities to its correspondent sector and link companies along the ownership tree (i.e. subsidiaries to parent companies). Financial data is also used to identify the composition of funds and allocate these assets to portfolios as indirect ownership – if the portfolio is exposed to funds. The financial data is sourced by FactSet.

Physical Asset-Based Company Data (ABCD)

For each sector covered in the analysis, PACTA sources data from the data provider Asset Resolution (AR). In turn, AR sources its 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 the industry. The asset-based company-level data covers more than 280,000 individual physical assets (e.g., individual power plants, oil fields etc.).

The figure below shows the coverage of asset-level data relative to estimated global production figures—the global benchmark—for the power, oil & gas, coal, and automotive sectors. The figure highlights the share of assets that have been mapped to financial data and are thus included in the analysis.



Scenario data

Measuring alignment requires scenarios that explain what needs to happen in a sector to decarbonize. While climate change scenarios do not predict the future, they provide essential information to understand climate change, and the pathways projected to reach certain goals. In the efforts to tackle climate change, it is critical to understand what can and should happen to mitigate climate change. It is important to note that climate scenarios are built under different assumptions, and therefore can propose different courses of action to achieve climate targets. The table below shows an overview of the scenarios used in this report and which sectors they cover. Further details on climate scenarios are provided in Annex II.

Allocation methods: Ownership versus portfolio weight approach

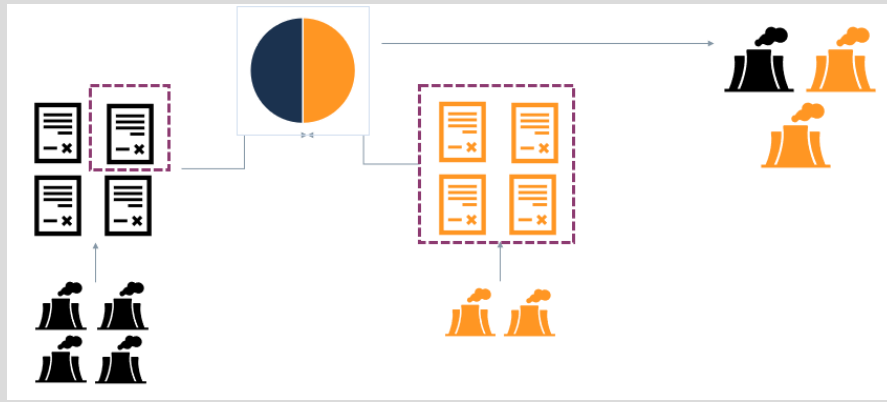
In the interactive report available for each portfolio, among the options for calculating and plotting the results, users can select between two methodologies - the Portfolio Weight Approach and the Ownership Weight Approach. These methodologies are used to attribute the physical assets of a company to the financial instrument or portfolio. The Ownership Weight Approach is only available for equity, and the Portfolio Weight Approach is available for both bonds and equity. For this Meta report, it was decided to use the Ownership Weight Approach for listed equity and the Portfolio Weight Approach for corporate bonds. The difference between these approaches is explained in the box below.

Box I.I.: Ownership Weight vs. Portfolio Weight Approach

The Ownership Weight Approach (OA) is based on what the investor owns. It is only available for equity as the equity holder has a proportion of the company that is delimited by the number of shares they own. As the owner of a proportion of the company, they have control over that same proportion in companies' decision-making.

As an example, let us assume there are two companies that compose a portfolio, each one of them issue four shares, and the portfolio is owner of one share of the blue company and four shares of the yellow company (see illustration below).

Under the ownership approach, 25% of the production of the assets owned by the blue company (1 power station) and 100% of the assets owned by the yellow company (2 power station) will be attributed to the portfolio.



The Portfolio Weight Approach (PA), on the other hand, allocates the production of the physical assets of the companies based on the proportion that the company represents in the portfolio. Although bondholders have relevant bargaining power with the issuer, investors do not have decision-making rights, which is why the Ownership Weight Approach would not be suitable.

The result of the previous example under the Portfolio Weight Approach would be as follows: If the same portfolio is composed of two companies that are equally weighted, the Portfolio Weight Approach would attribute half of the production of the assets owned by the blue company and half of the production owned by the yellow company to the portfolio. Thus, two power stations from the blue company, and one power station from the yellow company.



As mentioned previously, in the individual interactive reports, users can choose the allocation methodology used in each of their charts, however, for this report, the portfolio approach was used for bonds and the ownership approach for equity.

As the explanations above show, even though both the Portfolio Weight Approach (PA) and the Ownership Weight Approach (OA) allocate physical assets to financial portfolios, they are based on different calculation methods. The OA approach allocates the “owned” physical assets of investors to their portfolio and thereby depicts production values from a real-world and macro perspective, while the PA allocates physical assets based on the weight of a company within the portfolio. I.e., the PA comes rather from a risk perspective of the individual institution.

These differences reflect that both approaches answer slightly different questions, based on the asset classes they are used for. While the ownership of listed equity allows attributing responsibility of physical assets to an investor and the investor has decision-making power based on their shares, the investment in corporate bonds do not allow the same level of engagement, which is why the PA rather reflects a risk-perspective on the exposure to the transition-related (mis-)alignment.

Please see an overview of the key differences between the two approaches below:

Ownership weight approach (for listed equity only)

- Answers the following question: How can the responsibility for the physical assets and total production be allocated to financial assets?
- Allocates production to your portfolio based on your real-world ownership.
- Does not include funds as funds are not directly owned and therefore investors cannot engage with invested companies in the same way as with directly owned financial assets.
- Allows monitoring of climate alignment of real production and is therefore especially useful from a macro and political perspective.

Not applicable to corporate bonds in PACTA.

Portfolio weight approach (for corporate bonds in this analysis)

- Answers the following question: How exposed is your portfolio to different technologies?
- The portfolio weight approach is a representation of the investor’s allocation choice and is inferred as a more risk-intuitive allocation rule
- Does not show “ownership” of technologies in the real world, but rather takes a risk-perspective focusing on the exposure to companies and technologies.
- Applicable to listed equity and corporate bonds.

PACTA metrics

The PACTA analysis measures alignment using three different metrics: Exposure shown as the Technology Share Mix, alignment with either the Production Volume Trajectory, or the Emission Intensities. The technology mix and the volume trajectory are used for the power, fossil fuels, and automotive sectors, for which there exist clearly defined technology decarbonization pathways. For example, in the power sector, there are technologies to transition to, i.e., coal-fired power generation can shift to renewable energies. For other sectors, where technology decarbonization pathways are not so well defined, such as steel, cement, and aviation, PACTA

uses an emission intensity metric to compare it to scenario benchmarks. Each of these three metrics is explained below.

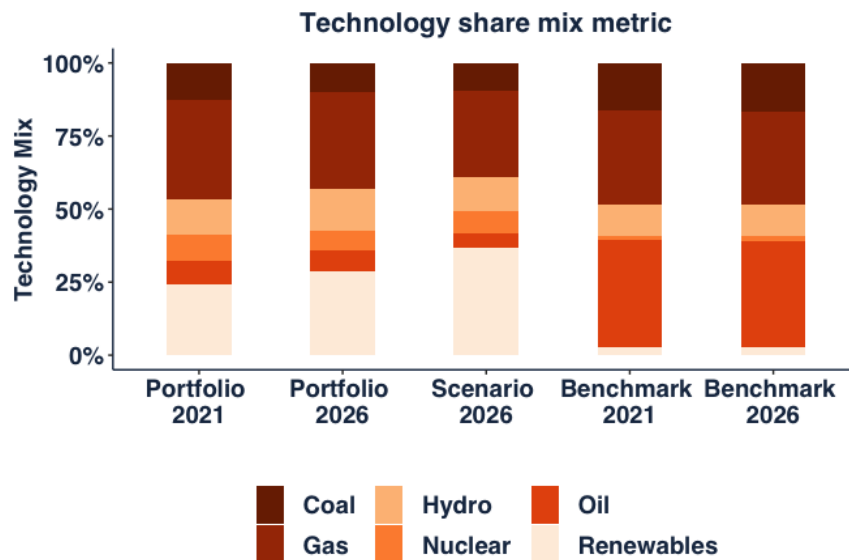
Exposure: Technology share mix

The technology share mix metric 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 below as an example).

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

- the changes in the technological processes by which outputs are produced (e.g., shift from coal-fueled to renewable-fueled power capacity)
- changes in the nature of the output itself (e.g., shift from internal combustion engines to electric vehicles).

This metric measures the portfolio's relative exposure to the economic activities that are 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.



The figure above shows the high and low-carbon technology mix for the power sector in a sample portfolio:

- Portfolio 2021: reflects the current technology mix of the power sector in the analyzed portfolio.
- Portfolio 2026: reflects the future technology mix of the power sector in the analyzed portfolio.

- Scenario 2026: shows the projected technology mix of the portfolio in 2026 based on the SDS scenario.
- Benchmark 2021: reflects the current technology mix of the power sector based on the current production plans of companies comprised at a market index benchmark.
- Benchmark 2026: reflects the future technology mix of the power sector based on the capital plans for the next five years of companies at a market index benchmark.

PACTA assumes a static balance sheet. As such, the difference in the technology mix between Portfolio 2021 and Portfolio 2026 is solely a result of the production plans of the companies the investor is currently financing and not a result of any change in the portfolio composition.

Alignment: production volume trajectory and emission intensities

Production of Volume Trajectory

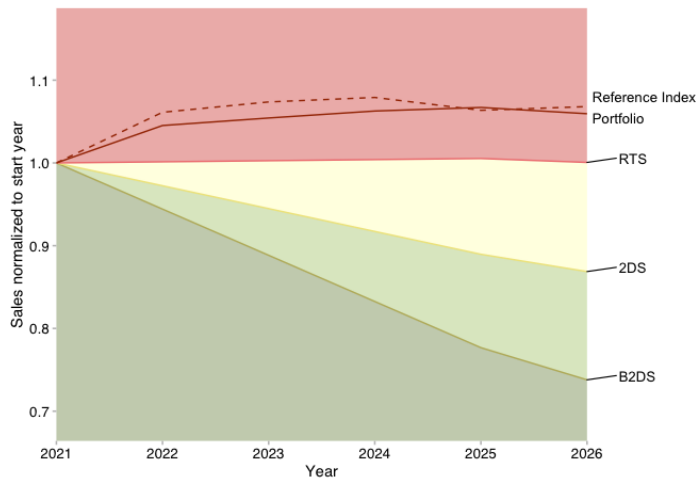
The production volume trajectory metric aims to measure the forward-looking alignment of a portfolio's projected production volumes, based on the five-year capital plans of companies, to the production volume ranges set as targets in different climate scenarios.

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 sheer expansion or contraction in production coming from the technology/fuel (e.g., a company brings a new coal-fired power plant online). The Figure below shows an example of the production volume trajectory metric for internal combustion engine (ICE) vehicles.

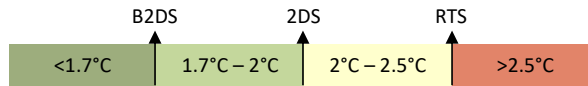
Amount of ICE cars allocated to the investment portfolio. This is the “planned production profile” of the companies that

Amount of ICE cars produced by companies in a specific benchmark.

Coloured areas denote the production volume ranges that are compatible with different climate scenarios.



Misalignment with a <2° C scenario.



The Y-axis of the figure shows the normalized production, in this case sales planned for the next five years with the current capacity represented as 1. The chart shows that the portfolios' ICE vehicles' production trajectory falls within the red area and increases between 2020 and 2026. This means that the portfolio companies' production plans for ICE vehicles for the next five years are not compatible with the Beyond 2 Degrees Scenario (B2DS) and perform worse than the 2 Degrees Scenario (2DS) and the (Reference Technology Scenario (RTS), but similar to the selected benchmark (please note that these are just example scenarios - the scenarios change every year according to data availability).

Box I.II

Interpreting the technology share mix metric and the production volume trajectory metric altogether

The technology mix metric and the production volume trajectory metric both provide an indication of the alignment of portfolio companies 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, while the production volume trajectory measures whether the rate of change in the production amount is sufficient to meet 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 credit 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 increase of renewable power generation may be too small to meet the same scenario from a production volume trajectory perspective, because companies in the portfolio might not be planning an increase in their production plans in the next five years.

Emission intensities

The emission intensity metric measures the average CO₂ intensity of the portfolio in the steel, cement, and aviation sectors. This emission intensity is given as CO₂/economic unit of output (for example, CO₂/per ton of steel produced). This is then compared to an emission intensity reference point set by a climate scenario.

While this is not the main metric of choice for the largest sectors tackled in this methodology, the emission intensity of the activities financed by the portfolio is nonetheless the first metric in sectors for which no clear technology pathways have been set out (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 emission intensity metric is used.

Qualitative survey

The climate action analysis is based on the survey that participants had the chance to use to report their climate actions. While specific steps of the survey analysis are already described in the main report, this section will only provide a short overview of the aim of the survey and its components.

The qualitative survey is a supplement to the quantitative PACTA analysis. The survey consisted of 33 questions of different levels of granularity. While some targeted the institutional level, others assessed information on an asset-, sector-, or company-level. It is important to note that the responses to the survey are self-reported and have not been further verified. The analysis, therefore, relies on the veracity and consistency of participants' survey responses.

In this test, the qualitative survey responses have been evaluated together with PACTA results to bring insights on how to improve climate strategies and scenario alignment to achieve greater real economic impact on CO₂ emissions and capital flows. Outcomes can potentially then be detected and tracked in the future using in combination with the PACTA methodology. This section, therefore, serves as a connection point between past strategies, present metrics results, and future actions.

The climate action analysis is divided into 3 main components:

- Exposure to and climate strategies per asset classes
- The ambition of broad climate strategies
- Membership in climate and responsible investing initiatives
- Negative screening strategies compared to PACTA's fossil fuel exposure results
- Engagement strategies compared to PACTA's alignment results
- Thematic investment strategies compared to PACTA's low-carbon technologies exposure

Annex II: Scenarios – what are climate-related scenarios and decarbonization pathways?

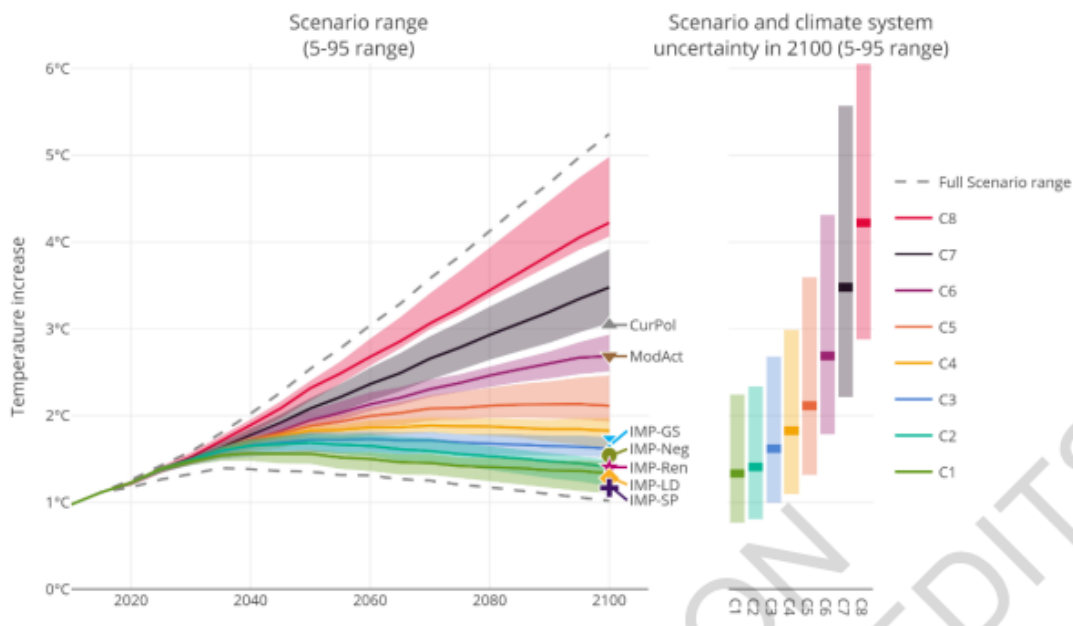
In the efforts to tackle climate change, it is critical to understand what can happen and what should happen in the future that, although uncertain, can be planned for with the aid of the foresight provided by scenarios. Climate-related scenarios have been defined as being:

‘A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships’ IPCC (2021)

Climate-related scenarios are therefore depictions of possible futures that incorporate scientific, technical, and socio-economic assumptions in order to describe a range of potential pathways to the future. They constitute a powerful tool that allows society to understand the consequences of not taking action today and, importantly going forward, the scale and pace of technological change and investment that is likely to be required in order to mitigate climate change.

Understanding scenarios and their sectoral pathways

A common reference point for understanding scenarios is the indicative pathways developed by United Nation’s Intergovernmental Panel on Climate Change (IPCC), whose regular reviews and updates of the latest climate science form the basis for international policymaking. The IPCC maintains a global database of models and scenarios that it reviews in order to create a set of indicative pathways to different average global mean temperature rises in 2100, together with their associated probability and what they imply in terms of the techno-economic and social change required. Their latest and 6th review, published in October 2021 in advance of COP26, presented eight pathways for policymakers to consider at the global level (see figure below).



Whilst useful to understand the headline scale of change and investment required, the IPCC pathways are in general not granular enough to use at the sector level in PACTA. To measure alignment scenarios based on Integrated Assessment Models (IAM) are required. They tend to be built-up from much more granular information on what needs to happen at the sectoral level in order to contribute to achieving an overall climate goal, such as limiting the global average mean temperature rise to 1.5°C.

Scenarios with decarbonization pathways that can be used by PACTA have been developed by the International Energy Agency (IEA), the European Commission, and on behalf of other organizations such as United Nations Principles for Responsible Investment (PRI), the Network for Greening the Financial System (NGFS) and the Net Zero Asset Owners Alliance (NZAOA). The scenarios selected for use with PACTA generally have two main features that lend themselves to alignment measurement:

- **A set of scenarios:** They come as a set, reflecting different possible political, social, and economic futures as well as different climate outcomes. This is important because it allows internally consistent comparisons to be made between a baseline that represents what may happen if the transition occurs according to current policies that are modeled to be on track to limit global warming to 2.7°C and what will need to happen in order to accelerate the pace of change in order to limit global warming to below 2.0°C or, ideally, 1.5°C.
- **Sector decarbonization pathways:** They provide sectoral decarbonization pathways against which progress and in particular alignment can be measured. Decarbonization pathways have been defined as being:

“A temporal evolution of a set of mitigation scenario features, such as greenhouse gas emissions and socio-economic development, towards a future state. Pathways can include narratives of potential futures and

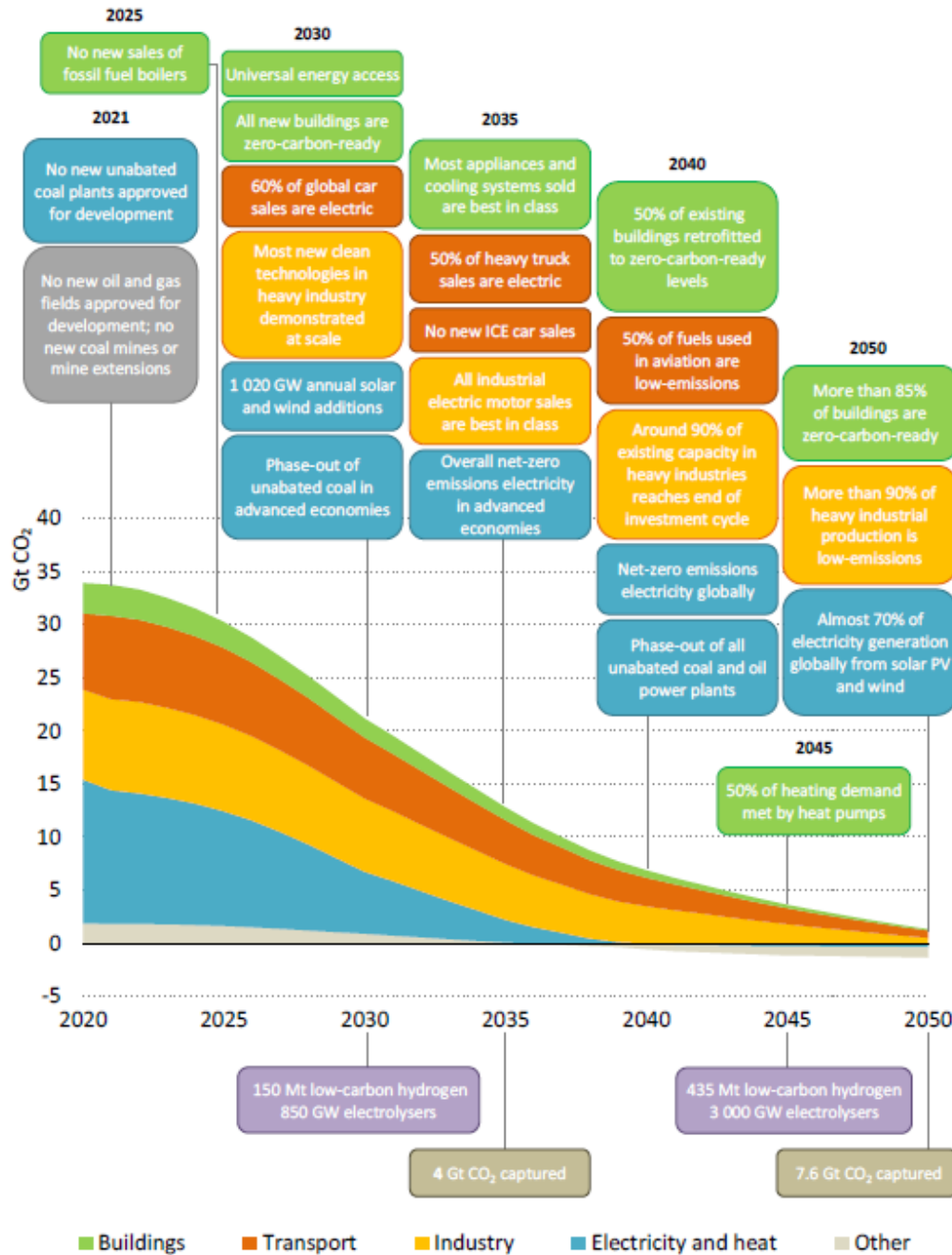
solution-oriented decision-making processes to achieve desirable societal goals.” (IPCC 2021)

Pathways tell us how the different technologies will shift within a sector or how the emissions intensity will change as a result of implementing different measures over time.

These selected scenarios and their pathways are built up from a range of socio-economic and technical assumptions, as well as expert judgments. It is therefore important when using them to be aware of some of the main differences between them and the drivers for different climate outcomes. Some of the factors to bear in mind that can differ from the modeling of one scenario to the other can include:

- The speed at which decarbonization occurs;
- Availability and maturity of technologies, their scalability, and cost;
- Favoring or ruling out different technologies (e.g. reduced role for nuclear power, more prominent use of carbon capture technologies);
- 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.)

Based on the IEA’s Net Zero Energy by 2050 scenario, the figure below illustrates the types of assumptions and technological changes that may inform different sectoral pathways within a scenario (as indicated by the different colours) and on what timescale.



Suggested reading on scenarios

Carbon Brief, Explainer: How ‘Shared Socioeconomic Pathways’ explore future climate change, April 2018. <https://www.carbonbrief.org/explainer-how-shared-socioeconomic-pathways-explore-future-climate-change>

I4CE, Understanding transition scenarios – eight steps for reading and interpreting these scenarios, November 2019

Institut Louis Bachelier et al. (2020) Alignment cookbook on choosing one or several scenarios and associated trajectories.

TCFD, Technical supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities, June 2017

TCFD, The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities, <https://www.tcfddhub.org/scenario-analysis/>

Limitations and assumptions of the scenarios used in the Climate Test 2022

As has already emphasized, scenarios and their sectoral pathways are depictions and models of possible futures, they are not forecasts of what will happen. When reading the Switzerland Climate Test results for meta, peer group, and individual financial institution portfolios, it is therefore important to understand the underlying limitations and assumptions behind the scenarios used as the basis for the analysis.

Probability of achieving the stated climate outcomes

Probability is a significant factor to bear in mind. In general, the climate outcome or target of stabilizing global warming at the degrees Celsius target above pre-industrial levels by 2100 should be accompanied by a percentage probability. Thus, based on table 1 for the IEA WEO scenario set, aligning with a 2°C scenario may represent, for example, only a 50% chance and thus won't necessarily lead to the limiting of global warming to 2°C and in fact, the probability of falling below 2°C falls to 33%.

Scenario	2030		2050		2100	
Confidence level:	50%	33% – 67%	50%	33% – 67%	50%	33% – 67%
Stated Policies	1.5	1.4 – 1.6	2.0	1.8 – 2.1	2.6	2.4 – 2.8
Announced Pledges	1.5	1.4 – 1.6	1.8	1.7 – 2.0	2.1	1.9 – 2.3
Sustainable Development	1.5	1.4 – 1.6	1.7	1.5 – 1.8	1.6	1.4 – 1.7
Net Zero Emissions by 2050	1.5	1.4 – 1.5	1.5	1.4 – 1.7	1.4	1.3 – 1.5

Note: Shows the maximum temperature rises with 33%, 50% and 67% confidence levels. Source: IEA analysis based on outputs of MAGICC 7.5.3.

The second table below compares the overall global warming goals and probabilities of four ambitious scenarios analyzed using PACTA. The use of a given scenario from within a set (e.g. from with WEO 2021 – NZE, SDS, NPS, CPS) does not constitute an assumption that this scenario is more likely to prevail than others, but the assumptions made about the market maturity of the different technologies in the pathways can provide an overall indication of the degree of uncertainty. It is also important to note that the choice of IEA scenarios or other providers should not be interpreted as an endorsement of the underlying assumptions by RMI.

Scenario parameters	IEA WEO 2021 SDS scenario	IEA Net Zero by 2050 scenario	ISF (NZAOA) Net Zero scenario	JRC GECO 1.5°C Unified scenario
Average global temperature target in 2100	1.6°C	1.4°C	1.5°C	1.5°C
Probability of achieving warming goal by 2100	50%	50%	66%	50%

The assumptions and judgments related to technological maturity

Most ambitious scenarios rely on assumptions about the implementation of technologies, some of which are still in the early stages of development and hence may not be available at the speed and scale that the scenario requires. For example, one criticism of the IEA 2°C and SDS scenarios is that it relies on a significant portion of BECCS (Bioenergy with Carbon Storage) up to 2050, which might not be technically feasible. The table below summarises the main assumptions and expert judgments about the technological maturity of solutions.

Scenario parameters	IEA WEO 2021 SDS scenario	IEA Net Zero by 2050 scenario	ISF Net Zero scenario	JRC GECO 1.5°C Unified scenario
Main identified sources of model uncertainty	Covid uncertainties, behavioral changes, CCUS for fossil fuels	Behavioral change, bioenergy, CCUS for fossil fuels	Behavioral change, large-scale deployment of renewables 4	Carbon price and mitigation policies
Main assumptions on technology maturity	60-65% of required CO ₂ reductions are from technologies currently commercially deployed.	50-60% of required CO ₂ reductions are from technologies currently at demonstration or prototype stage.	Only considers theoretical technologies that have demonstrated proof of concept.	A technology learning-curve approach is applied.

The role of different technologies in each scenario

Underpinning the four selected scenarios are major technology shifts. In the past, IEA scenarios have been quite conservative and have underestimated both energy efficiency developments and renewable deployment rates. This is because technology learning rates and cost reductions turned out to be faster than predicted. This means that the scenarios might not be ambitious enough (compared to what is feasible) and that there is a need for more ambitious scenarios that lead to higher probabilities of limiting global warming to well below 2°C, one of the main

goals of the Paris agreement. The table below compares and contrasts the role a number of key high and low-carbon technologies are earmarked to play in the selected scenarios – including energy demand, fossil fuel use, renewable energy, and carbon capture.

Scenario parameters	IEA WEO 2021 SDS scenario	IEA Net Zero by 2050 scenario	ISF Net Zero scenario	JRC GECO 1.5°C Unified scenario
Primary Energy demand reduction	17% less in 2030 compared to 2019	7% less in 2050 compared to 2020	8% less in 2050 compared to 2020	7% less in 2050 compared to 2020
Fossil fuel use and exploitation	Fossil fuel share in the primary energy mix falls around 70% by 2030	No new development or exploitation from 2020 onwards.	Emissions from fossil fuel must decline by more than half by 2030.	Fossil fuel share in the primary energy mix falls around 70% by 2050
The role of renewable energy	Renewable energy generation share increases from 30% in 2019 to 40% in 2030	Renewable energy generation is 60% of global power generation by 2030	Renewable energy generation share increases from 30% in 2019 to 40% in 2025	Renewable energy accounts for 78% of global power generation in 2050.
The role of nuclear energy	36% growth in nuclear capacity by 2040	76% growth in nuclear capacity by 2040	No new nuclear power stations	337% growth in nuclear capacity by 2040.
The role of carbon capture utilization and storage	2.9 Gt CO ₂ after 2050	7.6 Gt CO ₂ in 2050	No use of the technology	4.6 Gt CO ₂ in 2050
Use of nature-based solutions as offsets	80-240 Gt CO ₂ in 2050	No offsets assumed	152 Gt CO ₂ in 2050	Use of forest management to mitigate emissions.

Summary descriptions of the scenarios used in the 2022 climate test

In this section, an overview of the main scenarios used to measure the climate-related alignment and exposure of the meta and peer group portfolios is provided. The scenarios summarized have been developed by the IEA, the European Commission, and the Institute for Sustainable Futures. The individual scenarios within each set are described, allowing the reader to compare and contrast their rationale and basic assumptions.

International Energy Agency (IEA), WEO 2021 and ETP 2020

The IEA scenarios form part of two linked but separate energy models and publications, the World Energy Outlook (WEO) and Energy Technology Perspectives (ETP). Both are based on the IEA World Energy Model (WEM). The Net Zero 2050 scenario forms an extension of the WEO and has its own supporting documentation⁵⁷.

⁵⁷ IEA, Net Zero 2050, published May 2021 <https://www.iea.org/reports/net-zero-by-2050>

The WEO and ETP each provide sets of scenarios, providing depictions of potential future outcomes from current stated policies, orderly policy transitions in response to the Paris Agreement, as well as ambitious sustainable development and net zero transitions towards meeting specific climate goals. The IEA scenarios, therefore, allow for a scenario selection to be based on the overall strategic objectives for climate mitigation and the extent to which each scenario deviates from current climate change policies.

The WEO provides insight into the energy sector, with a focus on pathways for the fossil fuel and power generation sectors. The ETP covers the buildings, transport, and heavy industrial sectors. In PACTA, it is used for industry and transport, namely the steel, cement, and automotive sectors. It provides pathways with a time horizon from 2017 to 2070. In contrast, the WEO only extends until 2050. The WEO and ETP scenario set comprises:

- **Stated Policies Scenario (STEPS):** This scenario incorporates policies declared today. The goal of this is to assess what the world may look like in the future based on policies that have currently been announced. Energy demand rises by 1% per year until 2040. More than half of this growth in demand is met by solar photovoltaics (PV) while natural gas enabled by trade in liquefied natural gas (LNG) accounts for a third. Oil demand plateaus in 2030. Despite this, the global economic and population growth means that there is no peak in global emissions ahead of 2040 and hence globally shared sustainability goals (like those set out in the Paris Agreement) are missed. If all the targets are achieved as set out by this scenario there would be at least a 50% chance of limiting global temperature rise to 2.7°C by 2100.
- **Sustainable Development Scenario (SDS):** This scenario aims to meet stricter sustainable development goals. This requires rapid and widespread changes across all parts of the energy system. It is aligned with the goals set out in the Paris Agreement, with a 50% chance of limiting global temperature rise to below 1.65°C by the end of the century, as well as objectives related to universal energy access and cleaner air. These efforts are shared amongst multiple fuels and technologies.

In addition, the WEO in 2021 started to include an ambitious 1.5°C, 'net zero' scenario:

- **Net Zero Emissions by 2050 (NZE)** This scenario extends the SDS scenario in order to target net zero emissions. The scenario responds to the increasing number of countries and companies that have made commitments to reach net zero emissions earlier combined with the aim of limiting the rise in global temperatures to 1.5°C by the end of the century (with a 50% probability). In particular, it explores the actions needed in the period to 2030 in order to be on track to achieve net zero emissions by 2050, including the need to end new fossil fuel exploitation from 2021 onwards and to avoid stranded assets across sectors. The original May 2021 documentation is provided below, as many of the scenario and sectoral pathway assumptions remain unchanged.

[IEA, Energy Technology Perspectives \(2020\)](#)

[IEA, World Energy Outlook \(2021\)](#)

[IEA, Net Zero by 2050 \(2021\)](#)

European Commission Joint Research Centre (JRC), GECO 2021

The Global Energy and Climate Outlook (GECO) scenario set has a basis in the energy-economic models that are used by the Joint Research Centre (JRC) to inform policy-making by the European Commission, combining the use of a global energy model (POLES) and a global economic model (GEM-E3). It provides pathways for all PACTA sectors, with the exception of cement. The time horizon extends to 2070. The 2021 edition of GECO comprises three main scenarios:

- **Current Policy (CurPol)** This scenario models at a macroeconomic level the effect of enacting current policies that have already been adopted up until 2019. If there are NDC targets at the national level but no policies, then these are not taken into account. Macroeconomic projections for GDP and population growth are combined with the modeled effects of policies on energy prices and technology development and deployment in order to then make projections for changes in energy systems and CO₂ emissions. The effects of the Covid-19 pandemic on the energy system are factored into the modeling of growth and in particular in the transport sector. The global temperature outcome of the scenario is not specifically stated in the scenario literature, but the charts indicate greater than 3°C⁵⁸.
- **Nationally Determined Contributions and Long-term Strategies (NDC-LTS)** This scenario uses the Current Policy as its starting point and adds the potential effect of NDC policies in the short term and in the longer term policy measures that may be implemented post-2030. This scenario results in a 50% chance of limiting global temperature rise to 1.8°C by 2100.
- **1.5°C Unified (Unif)** This scenario represents an economically efficient pathway to achieving 1.5°C. The scenario assumes a low overshoot by 2050 (1.7°C) with global net zero GHG emissions reached before 2070. It assumes the application of a single global carbon price from 2021 onwards and that this functions as the main policy driver. It has limited reliance on carbon capture and storage technologies and does not consider financial transfers between countries to implement mitigation measures. If all the targets are achieved as set out by this scenario there would be at least a 50% chance of limiting global temperature rise to 1.5°C by 2100.

A second version of the 1.5°C scenario has also been developed, a 'differentiated' scenario in which the carbon price is varied on a regional basis. This scenario is not currently available as part of the GECO 2021 scenario set prepared for use with PACTA.

JRC, Global Energy and Climate Outlook (2021)

Institute for Sustainable Futures, Net Zero scenario

This scenario was created upon the request of the Net Zero Asset Owners Alliance (NZAOA) and is an output of the One Earth Climate Model (OECM). It is intended to provide an ambitious 1.5°C scenario with a relatively high probability of achievement by 2100 and a low overshoot of this temperature in the first half of the century.

- **Sectoral pathways to Net Zero emissions:** The scenario presents a contrasting net zero scenario to that of the IEA, with a focus on existing, mature technologies, the exclusion of carbon capture technologies to achieve net zero, and greater overall investment in renewable energy and demand-side efficiency. If all the targets are

⁵⁸ See Figure 3 on page 13 of Keramidis et al, *Global Energy and Climate Outlook 2021: Advancing towards climate neutrality*, EUR 30861 EN, Publications Office of the European Union, Luxembourg, 2021,

achieved as set out by this scenario there would be at least a 66% chance of limiting global temperature rise to 1.5°C by 2100. Users of this scenario are encouraged to look at the ISF NZ scenario documentation.

[ISF, Sectoral Pathways to Net Zero Emissions \(2020\)](#)