

Commissioned by WWF Switzerland

Climate transition finance needs and challenges: insights from Switzerland

Report

Zürich, 12 May 2022

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Stephan Kellenberger, Fee Reinhart WWF Switzerland



Editorial Information

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Pictures

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Summary

With more and more companies worldwide vowing to contribute to the global effort to tackle climate change by reducing their greenhouse gas emissions to net zero latest by 2050, the question of how to finance the climate transition has gained much prominence in recent years. However, the growing popularity of the term “transition finance” contrasts with the lack of a clear and uniform definition in the literature. Therefore, this report aims first and foremost to improve the understanding of transition finance and raise awareness of its importance for a net zero economy.

As this report shows, Swiss financial institutions generally have a rather vague and broad understanding of transition finance by including all types of financing that support the transition to a net zero economy. Notwithstanding the diversity of definitions used, they agree that transition finance includes a shift from brown, i.e., high-emitting activities, to less brown or green activities.

The broader the definition of transition finance is, the more financial instruments potentially qualify for financing the net zero transition. While in theory, there are different financial instruments geared specifically towards furthering the climate transition, such as sustainability-linked bonds or loans, in practice, most of the consulted Swiss financial institutions do not offer such instruments and instead mostly rely on general corporate loans for transition-related purposes.

To determine which companies may be eligible to access bank lending and services to finance their transition, this report suggests that credible climate transition plans are essential and should be required from companies seeking external funding. Such plans appear particularly relevant in the context of standard financial instruments where the provision of funds is not tied to the attainment of defined environmental goals. The report advances several key criteria that transition plans should meet to be deemed credible.

Estimates indicate that between USD 3.2 and 5 billion per year is needed for the Swiss economy to become net zero by 2050. As a result of the Swiss economy’s characteristics, in particular its comparably lower domestic greenhouse gas emissions, the required annual investments are significantly lower than the corresponding figures for the EU and the world. The report finds that, overall, the Swiss financial sector is well prepared to satisfy the estimated investment needs. Nevertheless, Swiss financial institutions face important challenges when providing transition finance, such as the unfavourable risk-return profile of many investments, difficulties in measuring the impact of their financial decisions, and the uncertain regulatory environment.

These challenges also exist in the real economy, especially in the so-called “harder-to-abate” sectors, which provide essential services to society, while facing huge difficulties in reducing emissions. As shown by three case studies in such sectors, the net zero transition of companies is hampered by factors such as technological issues and profitability concerns. These difficulties are even compounded in the case of small and medium-sized companies, which often have only limited access to transition finance.

Looking ahead, the report concludes that consistent definitions and standards of what transition finance means, alongside robust criteria for credible transition plans, are needed for both financial institutions and companies. Further, specific financial instruments that foster companies’ transition to net zero should be developed and made widely available. Finally, regulatory action via incentives or prohibitions is required to improve the profitability of low-carbon products and services that are instrumental for a successful transition to a net zero economy.

Zusammenfassung

Weltweit versprechen immer mehr Unternehmen, einen Beitrag zu den globalen Bemühungen zur Bekämpfung des Klimawandels zu leisten, indem sie ihre Treibhausgasemissionen bis spätestens 2050 auf Netto-Null reduzieren. Dadurch hat die Frage nach der Finanzierung der Klima-Transition in den letzten Jahren stark an Bedeutung gewonnen. Der wachsenden Popularität des Begriffs «Transition Finance» steht jedoch sowohl in der Theorie als auch in der Praxis das Fehlen einer klaren und einheitlichen Definition in der Literatur gegenüber. Daher zielt dieser Bericht in erster Linie darauf ab, das Verständnis von Transition Finance zu verbessern und das Bewusstsein für ihre Bedeutung für eine Netto-Null-Wirtschaft zu schärfen.

Wie dieser Bericht zeigt, haben Schweizer Finanzinstitute im Allgemeinen ein eher vages und weit gefasstes Verständnis von «Transition Finance», in welches sie verschiedenste Arten von Finanzierungen einschliessen, die den Übergang zu einer Netto-Null-Wirtschaft unterstützen. Ungeachtet der unterschiedlichen Definitionen sind sie sich insgesamt jedoch einig, dass «Transition Finance» die Finanzierung einer Verlagerung von braunen, d.h. stark emittierenden Aktivitäten zu weniger braunen oder grünen Aktivitäten beinhaltet.

Je breiter die Definition von «Transition Finance» ist, desto mehr Finanzinstrumente kommen potenziell für die Finanzierung des Übergangs zu einer Netto-Null-Wirtschaft in Frage. Theoretisch gibt es verschiedene Finanzinstrumente, die speziell auf die Förderung der Klima-Transition ausgerichtet sind, wie zum Beispiel «Sustainability-Linked Bonds» oder «Sustainability-Linked Loans». Die meisten der befragten Schweizer Finanzinstitute bieten in der Praxis jedoch keine solchen Instrumente an und setzen stattdessen auf allgemeine Unternehmenskredite für transitionsbezogene Zwecke.

Glaubwürdige Pläne für die Klima-Transition sind von wesentlicher Bedeutung, um festzustellen, welche Unternehmen für spezifische Bankkredite und -dienstleistungen im Sinne von Transition Finance in Frage kommen. Sie sollten daher gemäss diesem Bericht von den Unternehmen, die eine externe Finanzierung anstreben, verlangt werden. Solche Transitionspläne scheinen besonders im Zusammenhang mit Standardfinanzierungsinstrumenten relevant zu sein, bei denen die Bereitstellung von Mitteln nicht an die Erreichung definierter Umweltziele gebunden ist. In diesem Bericht werden mehrere Schlüsselkriterien vorgeschlagen, die Transitionspläne erfüllen sollten, um als glaubwürdig zu gelten.

Schätzungen gehen davon aus, dass jährlich zwischen 3.2 und 5 Mrd. USD benötigt werden, damit die Schweizer Wirtschaft bis 2050 Netto-Null-Emissionen erreichen kann. Aufgrund der Eigenheiten der Schweizer Wirtschaft, insbesondere der vergleichsweise geringeren inländischen Treibhausgasemissionen, sind die erforderlichen jährlichen Investitionen relativ gesehen deutlich niedriger als die entsprechenden Zahlen für die EU und die Welt. Dieser Bericht

stellt fest, dass der Schweizer Finanzsektor insgesamt gut vorbereitet ist, um den geschätzten Investitionsbedarf zu decken. Dennoch stehen die Schweizer Finanzinstitute bei der Bereitstellung von «Transition Finance» vor grossen Herausforderungen, wie dem ungünstigen Risiko-Rendite-Profil vieler Investitionen, den Schwierigkeiten bei der Messung der Auswirkungen ihrer Finanzentscheidungen und dem unsicheren regulatorischen Umfeld.

Diese Herausforderungen bestehen auch in der Realwirtschaft, besonders in den so genannten «harder-to-abate» Sektoren, welche einerseits wichtige gesellschaftliche Bedürfnisse erfüllen, aber gleichzeitig vor grossen Schwierigkeiten stehen, ihre Emissionen zu reduzieren. Wie drei Fallstudien in solchen Sektoren zeigen, wird die Netto-Null-Umstellung von Unternehmen durch zusätzliche Faktoren wie technologische Fragen und Rentabilitätsprobleme behindert. Diese Schwierigkeiten sind im Falle kleiner und mittlerer Unternehmen, die oft nur begrenzten Zugang zu «Transition Finance» Produkten haben, noch verschärft.

Mit Blick auf die Zukunft kommt dieser Bericht zu dem Schluss, dass sowohl für Finanzinstitute als auch für Unternehmen einheitliche Definitionen und Standards von «Transition Finance» sowie solide Kriterien für glaubwürdige Transitionspläne erforderlich sind. Darüber hinaus sollten spezifische Finanzinstrumente entwickelt und weithin verfügbar gemacht werden, die die Transition der Unternehmen zu Netto-Null Emissionen fördern. Schliesslich sind regulatorische Massnahmen in Form von Anreizen oder Verboten erforderlich, um die Rentabilität von kohlenstoffarmen Produkten und Dienstleistungen zu verbessern, welche für die erfolgreiche Transition zu einer Netto-Null-Wirtschaft entscheidend sind.

Résumé

Plus en plus d'entreprises dans le monde entier promettent de s'engager contre le changement climatique global en réduisant leurs émissions de gaz à effet de serre à un niveau de zéro émission nette d'ici 2050. Par conséquent, la question du financement de la transition climatique a gagné en importance ces dernières années. Cependant, la popularité croissante du terme « Transition Finance » contraste avec l'absence d'une définition claire et univoque - en théorie et en pratique. Ce rapport, par conséquent, vise avant tout à améliorer la compréhension du financement de la transition climatique et à faire prendre conscience de son importance pour une économie de zéro émission nette.

Comme le montre ce rapport, les institutions financières suisses ont généralement une compréhension assez vague et vaste de la « Transition Finance ». Sous ce terme, elles incluent des types de financement divers qui soutiennent la transition vers une économie de zéro émission nette. Malgré la diversité des définitions utilisées, les institutions financières s'entendent sur le point que le financement de la transition climatique comprend le déplacement d'activités brunes, c'est-à-dire à fortes émissions, vers des activités moins brunes ou vertes.

Plus la définition du terme « Transition Finance » est vaste, plus les instruments financiers susceptibles de financer la transition vers une économie de zéro émission nette sont nombreux. En théorie, différents instruments financiers existent qui visent spécifiquement à favoriser la transition climatique, tels que les obligations liées au développement durable (« Sustainability-Linked Bonds ») ou les crédits liés au développement durable (« Sustainability-Linked Loans »). Néanmoins, dans la pratique, la plupart des institutions financières suisses consultées ne proposent pas de tels instruments et s'appuient plutôt sur des crédits d'entreprise généraux pour des objectifs de transition.

Afin de déterminer quelles entreprises sont éligibles aux crédits et services bancaires pour financer leur transition climatique, ce rapport constate que des plans de transition climatique crédibles sont essentiels et devraient être exigés des entreprises qui cherchent à obtenir un financement externe. Ces plans de transition semblent particulièrement importants dans le contexte d'instruments financiers standard pour lesquels la mise à disposition de fonds n'est pas liée à la réalisation d'objectifs environnementaux définis. Ce rapport présente plusieurs critères clés que les plans de transition devraient respecter pour être jugés crédibles.

Des estimations indiquent qu'entre 3,2 et 5 milliards de dollars sont nécessaires par an pour que l'économie suisse atteigne l'objectif de zéro émission nette d'ici 2050. En raison de caractéristiques de l'économie suisse, notamment ses émissions de gaz à effet de serre relativement bas sur le territoire, les investissements annuels nécessaires sont inférieurs aux chiffres correspondants pour l'UE et pour le monde. Ce rapport constate que, dans l'ensemble, le

secteur financier suisse est bien préparé à satisfaire les besoins d'investissement estimés. Néanmoins, les institutions financières suisses sont confrontées à des défis importants lorsqu'elles fournissent du financement de transition climatique : des profils de risque-rendement défavorables de nombreux investissements, des difficultés à mesurer l'impact de leurs décisions financières et un environnement réglementaire incertain.

Ces défis existent également dans l'économie réelle, spécialement dans des secteurs qui fournissent des services essentiels à la société mais pour lesquels des réductions substantielles des émissions sont difficiles (les « harder-to-abate sectors »). Toutefois, comme le montrent trois études de cas dans ces secteurs, la transition vers zéro émission nette des entreprises est entravée par des facteurs supplémentaires tels que des problèmes technologiques et des préoccupations en matière de rentabilité. Ces difficultés sont exacerbées dans le cas des petites et moyennes entreprises, qui n'ont souvent qu'un accès limité au financement de transition.

Pour l'avenir, ce rapport conclut que pour les institutions financières et les entreprises, des définitions et normes cohérentes pour la « Transition Finance » sont nécessaires, ainsi que des critères solides pour des plans de transition crédibles. De plus, des instruments financiers spécifiques qui favorisent la transition des entreprises vers zéro émission nette doivent être développés et rendus disponibles. Finalement, des mesures réglementaires comme des incitations ou des interdictions sont nécessaires pour améliorer la rentabilité des produits et services à faible émission de carbone qui sont essentiels pour réussir la transition vers une économie de zéro émission nette.

Foreword by Thomas Vellacott, CEO WWF Switzerland



The latest climate science shows that the window of opportunity to avert the worst effects of the climate crisis is rapidly closing. If we are to limit global warming to 1.5°C as provided in the Paris Agreement, a deep reduction in greenhouse gas emissions needs to happen rapidly, starting now and following a credible path to reach net zero emissions by 2050. Realising this far-reaching de-

carbonization requires a radical transformation of every part of our economy, especially high-emitting companies. Yet lowering emissions in these sectors is often challenging for a number of reasons.

The UN Climate Change Conference in Glasgow last year recalled the urgency of decisive climate action by all actors while emphasizing the crucial role of the financial sector in supporting the transition to net zero. More and more financial institutions are stepping up to the challenge posed by the climate crisis by setting science-based net zero targets and pledging to align their portfolios with the 1.5°C warming threshold. Growing momentum for net zero and increased mitigation efforts are also evident in the real economy. However, even the most ambitious climate commitments mean nothing unless they are turned into action. This requires, among many other things, that banks and other financial intermediaries must implement robust policies to end financing and underwriting for all fossil fuels, as urged by the International Energy Agency, and develop a comprehensive engagement strategy with all key stakeholders.

The question today is less whether a transition to net zero is possible but rather what this transition means for the economy as a whole and how it will be financed. By combining the perspectives of the financial sector and the real economy, this report seeks to explore the transition finance needs in Switzerland and what challenges arise in this context. In doing so, the report provides a first yardstick for assessing how well prepared the Swiss financial sector is for the transition to net zero. Clearly, the discussion on transition finance is still in its early days and there is no one-size-fits-all solution. We nevertheless believe that tackling the transition challenge openly and head on will be critical for successfully managing an orderly and just transition to net zero. Failing to do so will result in significant financial detriment and jeopardize both environmental goals and livelihoods. Financial institutions, real economy corporates, service providers, policymakers, and civil society must work together and make the necessary transition a reality, guided by a shared sense of urgency, transparency, and credibility.

1. Introduction

1.1. The Paris Agreement and the road to net zero

As confirmed by the IPCC report last year (IPCC, 2021), the scientific evidence on climate change is clear and indisputable: If we want to avoid the worst impacts of climate change and limit global warming until the end of this century to 1.5°C or at least to well below 2°C above pre-industrial levels, as determined in the Paris Agreement, we need to transform the economy swiftly towards decarbonisation and net zero emissions of greenhouse gases (GHG). This transformation affects all sectors of the economy, with varying technological and financial implications and challenges (IEA, 2021). While potential emission reduction measures and related costs differ considerably across sectors, in some harder-to-abate sectors getting to zero emissions will be impossible from today's perspective (IEA, 2021; Energy Transitions Commission, 2018). Thus, it will be necessary to balance out remaining emissions with so-called negative emission technologies (NET), e.g., through nature-based solutions or carbon capture and storage (CCS) technologies. However, while some removal of CO₂ from the atmosphere using a mix of land-based carbon sinks and technological removal approaches will likely be indispensable to limit global warming to 1.5°C, the primary focus must remain on cutting GHG emissions rapidly and deeply¹.

At the international level, the recognition of the need for the economy to transition to net zero has led to a variety of net zero carbon pledges by states, cities, financial institutions, and corporations. For example, many financial actors have united in common initiatives and alliances. These include the Net Zero Asset Owner Alliance², the Net Zero Asset Managers Initiative³, the Net Zero Banking Alliance⁴, the Net Zero Insurance Alliance⁵, the Net Zero Financial Service Providers Alliance⁶, and the Net Zero Investment Consultants Initiative⁷. These financial sub-sector initiatives are bundled in the Glasgow Financial Alliance for Net Zero (GFANZ), an umbrella platform launched in April 2021 to accelerate the transition to a global net zero economy⁸.

¹ It is preferable to avoid any new GHG emissions from getting into the atmosphere in the first place. All CO₂ removal approaches carry either specific risks or potential trade-offs and limitations that are not easy to solve (Swiss Federal Council, 2020a; UN-convened Net zero Asset Owner Alliance, 2021). In addition, the carbon storage potential for instance in Switzerland is very limited which means that CCS technologies would never bring emissions from fossil fuel power plants completely to zero. See also position paper by WWF: https://wwfint.awsassets.panda.org/downloads/wwf_1_5c_position_paper_carbon_dioxide_removal_including_carbon_sequestration_in_natur.pdf

² <https://www.unepfi.org/net-zero-alliance/>

³ <https://www.netzeroassetmanagers.org/>

⁴ <https://www.unepfi.org/net-zero-banking/>

⁵ <https://www.unepfi.org/net-zero-insurance/>

⁶ <https://www.netzeroserviceproviders.com/>

⁷ <https://www.unpri.org/climate-change/leading-investment-consultants-form-global-initiative-to-push-for-net-zero>

⁸ By November 2021, GFANZ counts over 450 financial firms across 45 countries with assets worth over 130 trillion USD.

Box 1: WWF criteria for credible net zero commitments by financial institutions⁹

In order for net zero commitments to be credible, WWF believes financial institutions should:

1/ Pledge at the head-of-organization level to reach net zero by 2050 or sooner, in line with global efforts to limit warming to 1.5°C.

2/ Plan. Explain what steps will be taken toward achieving net zero and commit to calibrate all activities on science-based no/low overshoot 1.5°C scenarios (e.g., P1 or P2 pathways of the IPCC special report on 1.5°C warming) that do not rely on excessive carbon dioxide removal technologies, and hence require a global reduction of GHG emissions of approximately 50% by 2030.

3/ Proceed. Take immediate action to set the transition in motion – aligned with the scientific requirements set out in point 2 above – including:

- Setting a combination of short-term targets that cover all (i.e., no cherry-picking) of the following levels and activities: (sub-)portfolio level targets, targets for sectors, targets for company engagement and green investments targets.
- Adopt investment policies for the most material sectors that involve fossil fuels, deforestation- and conversion-related sectors (agriculture and forestry), high-carbon transport, high-carbon industry (e.g., cement, steel, chemicals, etc.).
- Commit to strive towards achieving impact in the real economy by developing a robust and publicly disclosed engagement strategy towards investee companies, policy makers and service providers as the primary tactic to achieve (sub-)portfolio targets. Such a strategy must include time-bound objectives and escalation steps in case engagement is not bearing fruit.

4/ Publish. Commit to measure and report progress towards 1.5°C alignment at least annually, including via, to the extent possible, platforms that feed into the UNFCCC Global Climate Action Portal.

5/ Contribute to the development and application of credible portfolio alignment methodologies that drive and measure the financial institution's contribution to real-world reductions in line with a 1.5°C pathway. This notably implies going beyond measuring 'financed emissions', including the need for financial institutions to immediately avoid investments in new high emitting infrastructure.

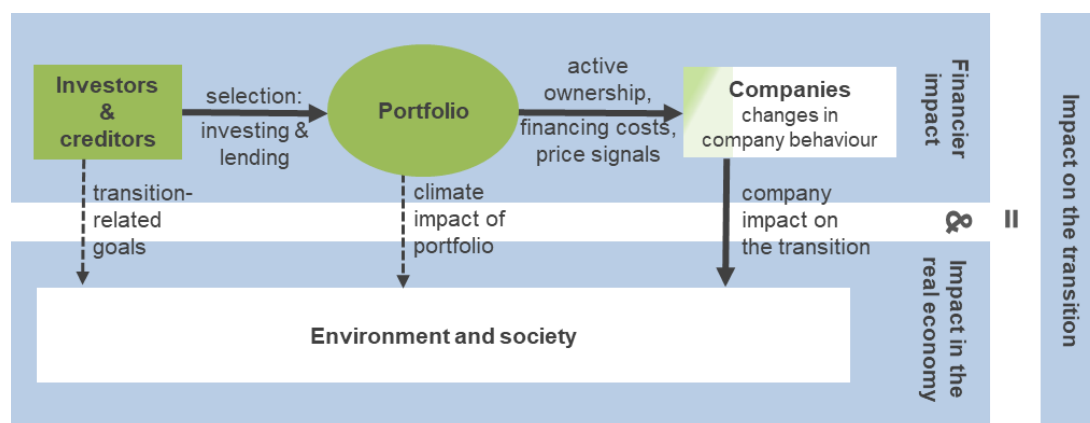
While membership to GFANZ is based on science-based commitments to net zero, in practice, the detailed commitments and how they are implemented vary across the different initiatives.

⁹ See the full version here: https://wwfint.awsassets.panda.org/downloads/wwf_criteria_for_credible_net_zero_commitments_by_financial_institutions_elisa_vacherand.pdf

As a result, there is a lively debate ongoing at the international level about what a credible net zero commitment by mid-century means and entails, with different recommendations proposed¹⁰. Reacting to the prevailing confusion within the financial sector over net zero targets, the UN Secretary-General António Guterres announced in November 2021 the creation of a new expert panel to analyse net zero emissions pledges in the private sector and propose clear standards to measure net zero commitments from non-state actors¹¹.

Financial markets constitute an important pillar of the transition through interdependencies with the real economy. By allocating capital to real economy actors, financial institutions can actively drive the transition towards a net zero economy. More specifically, they can support and accelerate the shift away from environmentally harmful business activities towards those that are either already aligned with a net zero pathway or are in the process of transitioning towards net zero.

Figure 1: Impact levers of investors and creditors.



This figure shows that investors and creditors can foster the transition broadly in two ways: a) *Portfolio selection* may promote the transition by improving financing conditions and strengthening the reputation of decarbonising companies, green technologies and innovative activities. Portfolio selection provides an important signalling effect to the whole economy. b) Through *active ownership* – i.e., engagement and (proxy) voting – investors and creditors may exert their influence on company decisions and behaviour, thereby improving a company’s climate impact over time. Active ownership thus represents a direct and strong signal to a specific company.

Source: Inrate (2022), based on Kölbel et al. 2019.

Another possibility for financial institutions to impact the real economy is through an active ownership approach on their shares of companies by using their voting rights and engaging in a direct dialogue with investee companies. Furthermore, offered financial products and services can be linked e.g., to sustainability performance benchmarks, thereby creating positive

¹⁰ See for instance the input paper from UNEP FI: <https://g20sfwg.org/wp-content/uploads/2021/10/2021-UNEP-FI-Recommendations-for-Credible-Net-Zero-Commitments.pdf>

¹¹ <https://www.un.org/press/en/2021/sgsm21017.doc.htm>

incentives for their customers. The main impact mechanisms and levers for financial institutions to speed the transition¹² based on the above-mentioned concept are shown in Figure 1.

At the intersection of transition activities and sustainable finance lies transition finance. Despite the growing use of the term transition finance, the notion has no clear, single meaning and is used ambiguously by different actors¹³. Most definitions have in common, though, their focus on emission-intensive activities. For some high-emitting sectors that produce essential goods and services for our economy, no clear net zero technologies or substitutes exist to date. These sectors are called harder-to-abate sectors and mainly comprise heavy industry and heavy-duty transport (see Figure 2). Since they are needed but cannot simply be replaced or substituted with existing low-carbon alternatives, full decarbonization of these harder-to-abate sectors remains challenging and requires large volumes of investments. Divesting from these sectors is generally not seen as a meaningful strategy to reach the agreed climate goals or promote the necessary transformation at the sector level. What appears more promising and ultimately more effective for these sectors is developing robust transition plans that enable high emitters to reduce their GHG emissions.

Figure 2: Harder-to-abate sectors.



Overview of the sectors typically considered “harder-to-abate” as defined by the Energy Transitions Commission (2018). These sectors are viewed as not replaceable while continuing to be responsible for significant fractions of global GHG emissions.

Source: Energy Transitions Commission (2018).

1.2. Scope, aim and limitations of this study

This report aims first and foremost to improve the understanding of transition finance and raise awareness of its importance for a net zero economy. Key aspects of the analysis encompass the general understanding of what transition finance means to Swiss financial institutions

¹² As defined in chapter 2.2.

¹³ Transition and transition finance do not necessarily only include the transition towards a net zero economy but can also be connected to other sustainability goals. Chapter 2 will detail how the term transition finance is used in this report.

and what volume of investment is expected to be needed for the transition of the Swiss economy. Furthermore, the report illustrates what challenges arise from these needs for Swiss financial institutions and transitioning companies.

The report does deliberately not focus on the financial risks associated with the transition to a net zero future nor on climate adaptation measures, even though both topics are equally relevant for the financial sector and the broader economy. Hence, we use the term transition finance in this report exclusively in the context of climate change mitigation and not climate change adaptation or resilience building.

In this study, a particular focus lies on large and high-emitting companies in the industrial sector in Switzerland. The industrial sector – albeit just one of many critical sectors for curbing GHG emissions – acts as a good proxy for high-emitting companies with harder-to-abate activities and products. Having said that, the critical role of households and individuals in the transition to net zero via for instance the green mortgage market is not a subject of this report.

This study was limited by the number of people or institutions who made themselves available for interviews. We attribute this to the novelty and the partially still low level of maturity of the topic within the economy. This also means that the sample of interlocutors is slightly biased towards those actors, who have already dealt with the topic of transition finance.

Finally, it should be noted that this report does not attempt to give a final answer to all questions regarding transition finance but rather seeks to provide a first assessment of the issues at stake and lay the groundwork for future research and discussions.

1.3. Methodology

This report is divided into three main parts: Understanding transition finance (chapter 2), assessing transition finance needs and challenges for the Swiss financial sector (chapter 3), and general challenges for high-emitting companies and the real economy in Switzerland (chapter 4).

All sections mainly build upon a desk research and literature review of existing information, data, and definitions, supported by financial figures, and the latest studies on the topic¹⁴. Further, we conducted qualitative, structured interviews with 10 Swiss financial market actors between July and September 2021 to receive insights on their understanding of topics covered in chapters 2 and 3. The interview questionnaire and a list of participants are given in Annex A1. The answers from these interviews were analysed qualitatively and quantitatively using MaxQDA¹⁵ and aggregated anonymously.

¹⁴ This report takes into consideration literature published until January 2022.

¹⁵ VERBI GmbH

To assess the investment and financing needs and challenges of the transition from an industry point of view, we put a focus on three high-emitting companies: Holcim, Steeltec, and BASF, for which we analysed publicly available company-specific information. In addition, we conducted a limited number of qualitative interviews with representatives of industry and academia, which were, however, not analysed quantitatively. These individuals are also listed in Annex A1.

2. Understanding transition finance

Based on a literature review and interviews with representatives from Swiss financial institutions, this chapter discusses the definitions of transition finance and the related financial instruments.

2.1. Policy context

Like the vast majority of UN member states, Switzerland has signed and ratified the Paris Agreement and, as a consequence, committed itself to reaching net zero emissions by 2050. This commitment is also at the heart of Switzerland's long-term climate strategy (Swiss Federal Council, 2021a). Building on the Swiss Energy Perspectives 2050+ that chart the course to net zero emissions from energy use, the long-term climate strategy outlines how Switzerland intends to achieve net zero emissions by 2050. It includes ten strategic principles¹⁶ as well as sector-specific sub-goals and challenges which need to be solved. At the national level, the CO₂ Act and the related CO₂ Ordinance are the legal foundations for Switzerland's climate policy and for honouring its international climate obligations. The full revision of the CO₂ Act would have mainly introduced, expanded, and increased CO₂ levies to tax high-emitting activities and used the resulting revenue to recycle back to the population and finance climate mitigation activities. This proposal, however, failed in a public referendum in June 2021, leaving a gap and creating many uncertainties as to how Switzerland may fulfil its international obligations and meet its national climate targets. In the meantime, a new proposal for a partial revision of the CO₂ Act leading up to 2030 has been tabled by the Swiss government and is currently in public consultation¹⁷. Like the earlier version, it aims to at least halve emissions by 2030. However, it does not contain any new levies, e.g., on fossil fuels.

¹⁶ 1. Switzerland will seize the opportunities presented by a systematic transition to net zero; 2. Switzerland will assume its climate policy responsibility; 3. Reducing emissions in Switzerland will take priority; 4. The emissions will be reduced across entire value chains; 5. All energy sources will be used efficiently taking account of their optimal utilisation; 6. The Swiss Confederation and the cantons will gear their planning activities to the net zero target in all climate-relevant areas; 7. The transition to net zero will be carried out in a socially acceptable way; 8. The transition to net zero will be carried out in an economically viable way; 9. The transition to net zero also improves environmental quality; 10. The long-term climate strategy is based on the principle of openness to all types of technology.

¹⁷ <https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-86492.html>.

Box 2: WWF's take on Switzerland's net zero target

In line with what is required by science and to meet the goal of the Paris Agreement to limit global warming to 1.5°C, WWF is of the view that Switzerland should reduce its GHG emissions to net zero at the latest by 2040. The reasons why WWF supports a more ambitious target than the Swiss government are mainly twofold: first, like other developed countries, Switzerland has a relatively larger responsibility for climate change, measured by its amount of GHG emissions released since the industrial revolution. Second, Switzerland has at its disposal a wide range of levers across various sectors and actors to effectively reduce its GHG emissions, both domestically and globally¹⁸.

Recognizing the vital role of the financial markets for sustainable development, Switzerland has set the ambition to become a leading global location for sustainable financial services (Swiss Federal Council, 2020b and 2021a). To achieve this objective, the authorities rely mostly on voluntary measures from the financial industry, while the government acts primarily as a facilitator and takes on a subsidiary role (Bingler et al. 2021). Until now, the Federal Council remains reluctant to introduce any binding sustainable finance regulation, even though the Swiss financial sector is currently not aligned with the goals of the Paris Agreement (Spuler, Thomä & Frey, 2020).

Switzerland's policy approach to sustainable finance, therefore, differs considerably from the EU, which gives regulation a much more prominent role in aligning financial flows with the goals of the Paris Agreement and in stimulating public and private investments for the transition to a low-carbon and climate-resilient economy (European Commission, 2021a)¹⁹. The EU's landmark action plan on financing sustainable growth from 2018 was followed in July 2021 by the renewed strategy for financing the transition to a sustainable economy (European Commission, 2021a). At the core of the actions to reorient capital flows towards a more sustainable economy stands the EU (green) taxonomy, which represents a common classification system for environmentally sustainable economic activities²⁰. While large parts of the EU taxonomy are still under development²¹, it is set to pivot around green activities, i.e., activities which

¹⁸ See Climate Master Plan Switzerland for a full description of the possible levers. https://www.klima-allianz.ch/wp-content/uploads/Climate_Masterplan_Switzerland_EN.pdf

¹⁹ An overview on the EU sustainable finance definition, publications and strategy can be found under: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en [29 October 2021].

²⁰ Further actions include for instance the development of an EU Green Bond Standard and further labels, amendments on sustainability topics to existing regulations or development of sustainability benchmarks.

²¹ A first delegated act on sustainable activities for climate change mitigation and adaptation was adopted by the European Commission in June 2021 and became applicable in January 2022. The provisions related to the other four environmental goals are still in development. A possible extension of the taxonomy beyond green activities is currently in discussion at the EU level.

contribute towards six defined environmental objectives: climate mitigation, climate adaptation, the sustainable use and protection of water and marine resources, the transition to a circular economy, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems.

2.2. Definitions of transition finance

2.2.1. According to the literature

The literature on transition finance has drastically increased in the last few years. However, no comprehensive, uniform and generally agreed definition has yet emerged.

Defining transition finance starts with asking what is meant by “transition”. The consensus in the literature reviewed is that transition relates to the transition towards a more sustainable economy. Accordingly, transition finance would refer to the financial resources that support this transition or parts thereof.

The details on what sustainability and a sustainable economy specifically entail, however, differ substantially. In this context, papers often refer to a net zero economy or an economy in line with a 1.5°C or, in some cases, a 2°C global temperature increase (e.g., ICMA 2020a, CBI 2020, Lombard Odier 2020). Others (e.g., OECD 2021, NATIXIS 2021, Caldecott 2020) consider more than merely a reduction in GHG emissions by factoring in other environmental and social dimensions of sustainability. Hence, given the **various uses of the term transition**, the definitions of transition finance vary significantly in the literature. Yet, they all agree that a reduction in GHG emissions must be addressed and make up an important part of the transition.

Box 3: WWF’s view on net zero commitment vs. Paris Agreement alignment commitment²²

In practical terms, a financial institution’s net zero commitment is often shorthand for ‘Net Zero by 2050 (1.5°C warming by end of century)’. Such a commitment might for some institutions already be part of their broader Paris Agreement Alignment commitment (‘well below 2°C and striving for 1.5°C warming by end of century’) as the former does not preclude the latter. However, the broader range of outcomes possible under ‘well below 2°C’ means that, for many actors, their Paris Agreement Alignment commitment might imply Net Zero around 2065, whereas a ‘Net Zero’ commitment usually relates to 2050 at the latest: the primary difference is therefore the ambition and speed of implementation. The difference between the

²²https://wwfint.awsassets.panda.org/downloads/net_zero_an_introduutory_guide_for_financial_institutions_june_2021.pdf

two, while potentially appearing marginal, is significant in terms of long-term impact since a 1.5°C world is safer than a 2°C world for people and nature²³.

Further reasons why finding a common definition of transition finance is difficult is the use of **different terms and expressions**: A variety of concepts are used simultaneously to describe some form of financing for the transition toward a sustainable economy. The following examples illustrate concepts with a clear and concise definition:

- *gfma & BCG (2020) employ the concept of **Climate Finance** to describe financing that “supports the transition to a low-carbon and climate-resilient economy by enabling both climate change mitigation actions, especially the reduction of greenhouse gas emissions, and climate change adaptation actions promoting climate resilience of infrastructure and social and economic assets.”*
- In their basic guidelines on **Climate Transition Finance**, the Financial Services Agency, Ministry of Economy, Trade and Industry and Ministry of the Environment of Japan (2021) define **transition finance** as “a financing means to promote long-term, strategic GHG emissions reduction initiatives that are taken by a company considering to tackle climate change for the achievement of a decarbonized society.”
- Caldecott (2020) finally equates **Transition Finance** to “the provision and use of financial products and services to support counterparties, such as companies, sovereigns, and individuals, realise alignment with environmental and social sustainability.”

At the same time, the term transition finance itself has been coined in fundamentally **different contexts**. The OECD (2019), for instance, introduced the concept in the context of developing countries’ access to finance along the development pathways they take. This essentially corresponds to what the UNFCCC calls climate finance (UNFCCC 2021).

More recently, the OECD has come up with another definition of transition finance (OECD 2021); one that is directly relevant to companies and less targeted at state actors’ access to finance. According to this definition, the OECD explicitly refers to the concept of “**Just Transition**” to ensure that the benefits of shifting to a decarbonized economy are widely shared among society while making sure that negative social impacts are avoided to the extent possible²⁴.

²³https://wwf.panda.org/discover/our_focus/climate_and_energy_practice/ipcc152/

²⁴ With the aim of ensuring that social injustice does not increase as a result of the transition towards a net zero economy, the EU has introduced a “Just Transition Mechanism”, including a dedicated Just Transition Fund. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en. Further information on the definition of just transition is given by the World Future Council: <https://www.worldfuturecouncil.org/what-is-just-transition/>

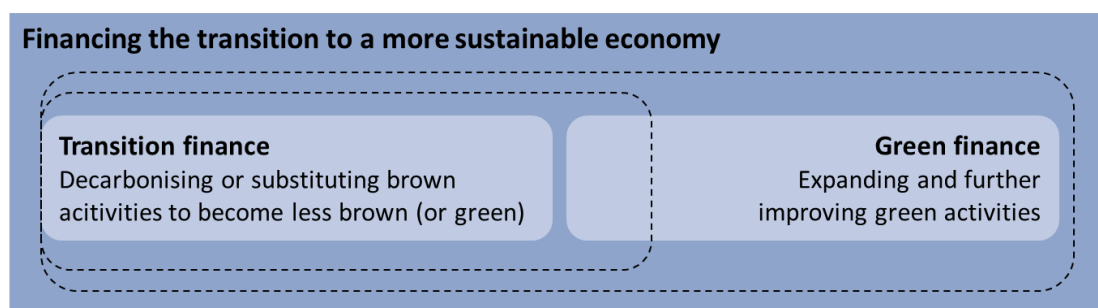
Similarly, the Climate Transition Finance Handbook (ICMA 2020a) focuses on Climate Transition Finance. However, its disclosure recommendations stipulate that issuers should outline how their climate transition strategy integrates considerations of a “Just Transition” wherever a transition may negatively impact workers and communities.

As evidenced by these few definitions of transition finance, there is presently no consensus in the literature on the environmental and/or social aspects that should be included. Furthermore, different authors focus on **different levels**: countries, companies, economic activities or even individuals.

Transition finance vs. green finance

Besides different meanings of the term transition, a fundamental distinction in the definitions used resides in the possible **scopes of transition finance** (Figure 3). For some actors (e.g., ICMA 2020a, gfma & BCG 2020), transition finance implies financing activities or companies transitioning from brown²⁵ to green²⁶; for others (e.g., Environmental Finance (2019), CBI (2020)), from brown to “less brown”²⁷ but not to green (see Annex A2 for examples). In this understanding, transition finance would refer to the transition from brown to less brown or green. Hence, the financing of activities or companies that are already green would not qualify as transition finance but rather as green finance.

Figure 3: Possible scopes of transition finance



Transition finance and green finance are both needed to finance the transition towards a more sustainable economy. Depending on the definition, the two appear more or less overlapping. Some definitions of transition finance might even encompass green finance.

Figure INFRAS.

²⁵ Brown means emitting high levels of GHG emissions, e.g., through the combustion of fossil fuels, which are far from being in line with climate-related goals.

²⁶ Green means in line with net zero.

²⁷ Less brown means that GHG emissions are reduced and part of a net zero pathway but are not (yet) in line with net zero.

The great variety of definitions agrees that transition finance aims to make activities, companies or even sectors greener. However, the proposed definitions differ on the respective starting points and targets. The definition we use in this report is described in chapter 2.2.3.

2.2.2. According to Swiss financial institutions

Most interlocutors define transition finance vaguely and include all financing of activities or companies that support the transition towards a net zero economy. This means that transition finance is not reserved exclusively for currently brown companies or sectors labelled as high-emitting but also helps expand activities or companies that are already green. An example for the latter would be financing research and development of new green technologies, which are no direct replacement of brown technologies such as Direct Air Capture (DAC)²⁸. According to the literature, such an activity would usually be classified as pure green finance (see section 2.2.1). However, it is important to note that out of the 10 Swiss financial institutions asked, only two had an official in-house definition of transition finance, while none of the others stated that they were actively looking to work on such a definition. One of the financial institutions has devised its own framework to differentiate between green and transition finance labels.

Due to the lack of uniform standards and official in-house definitions of transition finance, the following concepts of transition finance are therefore largely based on the subjective assessment of the interviewees and cover a wide range of potential definitions (Table 1)²⁹. The common denominator among our interlocutors is that transition finance always includes a shift from brown to less brown or green.

²⁸ <https://www.iea.org/reports/direct-air-capture>

²⁹ Notably, one of the institutions has strongly been involved in fostering a common understanding of transition finance and has, together with the Climate Bonds Initiative (CBI), published a frequently referenced white paper. Their definition has therefore also been included in the literature review (see 2.2.1).

Table 1: Definitions of transition finance by Swiss financial institutions

Definition: Transition finance...	Scope of transition covered	Number of financial institutions
<ul style="list-style-type: none"> ▪ is focused on sustainability on a general level. 	Transition from brown to less brown or to green as well as expanding green	3
<ul style="list-style-type: none"> ▪ is inherently linked to GHG emissions. 		3
<ul style="list-style-type: none"> ▪ only covers climate, specifically the transition to a low-carbon economy aligned with the Paris Agreement. 	Transition from brown to less brown or green	2
<ul style="list-style-type: none"> ▪ is associated with specific financial instruments such as sustainability-linked loans or bonds and potentially some green bonds. 		1
<ul style="list-style-type: none"> ▪ is aligned with the goals of the Paris agreement or other scientifically recognized methods with a net zero target, ▪ covers more than decarbonization, ▪ is separate from green finance such that only financing activities or companies ranging from brown to less brown would be considered as transition finance. 	Transition from brown to less brown	1

Brown: activities or companies are not aligned with a net zero economy. They have high CO₂ intensity and are not sustainable.
Less brown activities or companies are not aligned with a net zero economy, but they have a lower CO₂ intensity and are more sustainable than brown activities or companies.

Green activities or companies are already aligned with a net zero economy. They have a low CO₂ intensity and are sustainable.

Table INFRAS. Source: Interviews with Swiss financial institutions.

2.2.3. Definition used in this report

In this report, we focus on the transition towards a net zero economy, hence prioritize GHG emissions rather than other sustainability metrics. This preference does not mean that other social and environmental aspects should be ignored. However, GHG emissions are most easily assessed and are the only metric included in all definitions of transition finance proposed in the literature and by our interlocutors.

Furthermore, we embrace a definition of transition finance that includes the financing of the transition from brown to less brown or green because we believe that transition finance encompasses financing the transition of companies towards more sustainability, yet only if certain requirements are met (see chapter 2.3). In this sense, transition finance differs from green finance, which, for the scope of this report, means expanding or improving companies which are already green.

The fact that we explicitly include the transition from brown to green in our definition is especially relevant for the estimated investment needs outlined in chapter 3. As opposed to our definition, some of the studies reviewed make no distinction between green finance and transition finance at all. Consequently, they usually model the investment needs of the transition to a net zero economy as a whole. Therefore, deviations from our estimates can arise.

2.3. Financial instruments

As outlined in the section above, the various definitions of transition finance have different scopes. Depending on the definitions, the financial instruments that may be used to implement them vary accordingly (for details, see Annex A3). In the context of transition finance, the literature mainly differentiates between **use-of-proceeds instruments** such as green bonds and fixed-term **general-purpose instruments** such as sustainability-linked bonds or loans (e.g., ICMA 2020a, OECD 2021, Japan 2021). Both types offer better conditions e.g., through issuer premiums or a yield discount at issuance if specific criteria are fulfilled. In addition, CBI (2020) identifies **open-ended entity-level finance** (e.g., equity investments) as long as the entity follows a transition pathway in line with specific principles.

Generally, the broader the definition of transition finance is, the more financial instruments are potentially fit-for-purpose. For example, according to Caldecott (2020) and NATIXIS (2020), transition finance should be defined broadly enough to include the full range of financial products and services that can support companies in their transition, such as engagement activities, exclusion screenings or ESG integration next to the above-mentioned financial instruments.

As outlined previously, Swiss financial institutions often only have a vague definition of transition finance, which means that many financial instruments potentially qualify. However, most of the approached Swiss financial institutions do not offer financial instruments with specific transition finance characteristics. In fact, only two out of the 10 institutions interviewed have adopted typical transition finance instruments such as sustainability-linked bonds and green bonds. The remaining financial institutions use their standard instruments for general-purpose financing of companies even if the financing is supposed to support transition efforts.

The interviews with real economy experts have revealed that most listed companies finance their transition-related activities by either using liquidity from their cash flows (and are thus not even dependent on external financing) or regular corporate loans. Therefore, according to the interviews, the lack of specific transition finance instruments does not seem to be a limiting factor for listed companies. However, even if these instruments do not appear to be a limiting factor, they have a particular value insofar as they may lend credibility to the transition efforts of both the listed company and the financial institution as long as the criteria themselves are credible (see the following chapter). In fact, some companies have issued sustainability-linked bonds as a signal for their commitment to sustainability targets without speculating on a financial gain through issuer premiums (Kölbel & Lambillion 2022). Moreover, non-listed companies such as SMEs and specific projects still face challenges in accessing capital to finance their transition.

2.4. Credible climate transition plans

As in the case of net zero targets, the credibility of the endeavour that a company displays in its transition to net zero should be a key determinant to assess its eligibility for transition finance. Our interlocutors agreed that regulations specifically tailored towards transition finance are presently lacking. All but one observed that common standards should be developed, especially for the sake of transparency and comparability.

From a company's perspective, figuring out a transition pathway to net zero typically involves many projections and assumptions about the company's current and future GHG emissions across the whole value chain as well as the overall decarbonization trajectory of the market in which it operates. For an investor, having this kind of information is essential when considering investing in a company in a harder-to-abate sector to support its transition to net zero. Therefore, it is ultimately also a matter of sustainability disclosure.

Firm-level transition plans or roadmaps have emerged as a relatively new concept to describe companies' needs for a systematic approach to plan and implement the actions needed to meet their net zero goals. While the concept of transition plans has gained popularity recently, there is still no commonly agreed standard for what a good quality transition plan should look like.³⁰ To enhance credibility and avoid greenwashing, companies' transition plans should comply with a number of environmental criteria and disclosure requirements.

2.4.1. Criteria for credible climate transition plans according to the literature

As with the definition of transition finance, various criteria have been proposed in the literature on what a climate transition plan may comprise. For example, the Science Based Targets initiative (SBTi 2021) has developed the first comprehensive Corporate Net-Zero Standard for companies committing to net zero targets. This standard sets out four key criteria that make up a credible corporate net zero target. The four criteria are: near-term science-based targets in line with a 1.5°C pathway, long-term science-based targets in line with a 1.5°C pathway, beyond value chain emission mitigation, and neutralization of remaining emissions.

³⁰ See also the announcement made by the UK government on establishing a Taskforce to create a "gold standard" for firm-level transition plans: <https://www.gov.uk/government/publications/fact-sheet-net-zero-aligned-financial-centre/fact-sheet-net-zero-aligned-financial-centre>. WWF UK will feed into the Taskforce as formal member and is separately undertaking research looking at how financial institutions can integrate nature goals in their climate transition planning.

Box 4: WWF's connection to the Science Based Targets initiative (SBTi)³¹

WWF is a founding partner of the Science Based Targets initiative (SBTi), a coalition established in 2015 which aims to enable companies to set emission reduction targets in line with leading climate science. It is a collaboration between CDP, the United Nations Global Compact, World Resources Institute and WWF. The SBTi mobilizes companies to set science-based targets and boosts their competitive advantage in the transition to a low-carbon economy. The initiative defines and promotes best practice in science-based target setting, offers resources and guidance to reduce barriers to adoption, and independently assesses and approves companies' targets. In 2019, the SBTi initiated an inclusive, stakeholder-informed process to develop a framework to enable companies to set robust and credible net zero targets in line with a 1.5°C future. Launched in 2021, the SBTi's Corporate Net-Zero Standard is the world's first framework for corporate net zero target setting in line with climate science. In parallel, the SBTi kick-started work on a framework specifically for financial institutions with the aim to aligning their lending and investment portfolios with the ambitions of the Paris Agreement. The first global standard for net zero targets in the financial sector is currently under development³².

Next to the SBTi, several other organizations have defined minimum criteria for climate transition plans that go beyond the scope of credible net zero targets (e.g., CDP (2021), Climate Safe Lending Network (2021), CBI (2021), TCFD (2021)). While there is no commonly agreed set of criteria that a credible climate transition plan should meet, many authors agree on some key criteria. Therefore, based on the literature, a credible climate transition plan should...

- ...be science-based and aligned with 1.5°C global warming limits,
- ...be aligned with the overall business strategy,
- ...make board and management accountable,
- ...be time-bound and quantitative,
- ...take the whole organization and its value chain into account,
- ...be reviewed and updated regularly.

2.4.2. Proposed criteria for credible climate transition plans

While the proposed criteria in the literature are useful starting points, we think that more precise requirements are needed to determine the climate transition finance eligibility of

³¹https://wwf.eu.awsassets.panda.org/downloads/wwf_owning_the_future_asset_owners_and_climate_change_climate_action_survey_2021.pdf

³²<https://sciencebasedtargets.org/net-zero-for-financial-institutions>

companies. The benefits of more granular criteria include consistency and enhanced comparability across published firm-level transition plans. Fundamentally, we believe that it is essential **not to isolate the activity for which a company seeks external funding from the company itself**. In practice, this means that a transition plan should truthfully and adequately reflect the company's mission to reach net zero while at the same time disclosing how the business activities in question and existing assets are embedded in the overall, time-bound transition endeavour.

Based on our understanding of transition finance, the literature review and input from the interviews, we propose the following minimum standards for credible climate transition plans, which are a combination of material requirements and components from management theory:

Material requirements

- Climate transition plans should be **aligned with a 1.5°C climate scenario** pathway (IPCC 2018) and therefore reach net zero at the latest by 2050. This should be validated according to a suitable and scientifically founded alignment method³³.
- The assessment of this alignment should **encompass the entire value chain, i.e., Scope 1-3 emissions**, upstream and downstream³⁴. Inrate Climate Data from 2020 show that Scope 3 emissions on average make up almost 75 % of all GHG emissions for which a company is directly or indirectly responsible.
- Climate transition plans should be based on conservative climate scenarios, i.e., transition plans should have **minimal reliance on Negative Emission Technologies (NET) and Carbon Capture and Storage (CCS) and no or minimal temperature overshoot**. While NET and CCS are critical for our economies to reach net zero, it must be acknowledged that NET and CCS will only be able to capture comparatively small amounts of carbon (Infras 2020). For the majority of GHG emissions, it turns out more efficient to avoid them than to use NET and CCS. Thus, companies should first seek to minimise emissions to the extent possible and only rely on NET and CCS to neutralize emissions from sources without mitigation measures available (IPCC 2018).

³³ The following reports give an overview on several of such alignment methods: Measuring Portfolio Alignment (PAT 2021), Climate Alignment Cookbook (Institut Louis Bachelier et al. 2020) and Please Mr. Postman! 10 messages on portfolio alignment & implied temperature rise (2DII 2021).

³⁴ According to the Greenhouse Gas Protocol (WRI & WBCSD 2004):

Scope 1 = direct GHG emissions caused by a company's activities, i.e., that occur from sources that are owned or controlled by the company,

Scope 2 = indirect GHG emissions, e.g., from the generation of purchased electricity that is consumed by the company,

Scope 3 = other indirect GHG emissions occurring along supply, use and disposal chains of a company's products and services (excl. scope 2 emissions), including upstream emissions, e.g., from production of purchased materials, as well as downstream emissions, e.g., use of sold products.

Box 5: WWF's view on fit-for-Paris climate corporate strategies and "compensation" projects³⁵

From 2021, the world's efforts to tackle climate change are governed by the Paris Agreement. A Paris-compatible corporate climate strategy effectively combines the ambitious abatement of GHG emissions along the full value chain with conserving and expanding natural carbon sinks and mobilizing further long-term storage options, thereby removing GHG emissions from the atmosphere. This dual approach is needed to effectively tackle climate change and achieve net zero GHG emissions no later than 2050. Investing in natural carbon sinks is in this sense not an alternative to reducing emissions but a necessary complement. Under the Kyoto Protocol (2008-2020), the first international climate convention obliging industrialised countries to tackle climate change, such investments were often termed "compensation" projects: financing abatement measures or carbon sinks outside a company's value chain instead of within and claiming the GHG reductions as offsets for companies' own emissions. Due to the Paris Agreement's global coverage, companies cannot use such "compensation" projects anymore in the same way. Neither do they qualify for achieving science-based GHG reduction targets. Instead, in the era of the Paris Agreement, companies should financially commit to the value chain emissions that remain at the level of its social costs on their way to zero and invest this commitment for a maximum benefit for climate and nature.

Components from management theory

Alongside the outlined material requirements, climate transition plans should...

- ...contain net zero commitments and verifiable key performance indicators (KPI) to measure progress against these commitments,
- ...be approved and overseen by board and top management and integrated within the overall business strategy of the organization,
- ...have actionable, verified science-based near-term and long-term targets,
- ...list time-bound actions to decarbonise and reach set targets effectively and efficiently,
- ...be underpinned by a track record showing that the company delivers on promises to transform rapidly based on monitoring, controlling and reporting on targets and actions based on scientifically recognized methods,
- ...be revisited as new activities or scientific evidence emerge.

³⁵https://www.wwf.ch/sites/default/files/doc-2021-10/2020_12_15_WWF_Recommendations_Climate_Strategies_in_the_Paris_Era.pdf

3. Assessing transition finance needs and challenges

This section aims to give a quantitative overview of the actual costs or investment needs on a global and Swiss scale as well as of the key challenges for the financial sector and the real economy to reach net zero by 2050.

In the context of investment needs, it is important to note that the estimates made in this chapter as “investment needs for the transition” are not fully in line with the definitions of transition finance outlined above. The following estimates from the literature tackle the topic from the real economy side and are thus inherently agnostic to the financial instrument discussion, i.e., they generally do not consider how and with what financial instrument the articulated needs could be met. Implicitly, the estimates thus include much more than merely transition finance in the narrower sense and also extend to green finance, venture capital, development finance etc.

Further, there are two main methodological issues when assessing climate transition investment needs, which require careful analysis and differentiation to interpret present estimates correctly. Firstly, investments into all types of economic activities are necessary, for instance, for renovation, replacement or expansion of existing businesses, both in a business-as-usual scenario without climate alignment and under a net zero by 2050 scenario (henceforth called “replacement costs”³⁶). **Estimating the additional investment needs** which are instrumental to achieve the set climate targets **is extremely difficult** due to the inherent uncertainties about future technological, economic, and societal developments. Secondly, there is a fine but pivotal difference – especially when it comes to assessing the preparedness of the financial sector – between an investment need and a financing gap. Since investments are part of every business cycle, the fundamental question is not whether investments are needed, but rather if they can be financed or not through a company’s own cash-flow or by financial service providers.

Bearing in mind these subtleties, the following subsections present an overview of which sectors are expected to require the most transition finance (see section 3.1 and 3.2), how this is mirrored in Switzerland’s investment needs (see section 3.3) and how prepared the Swiss financial sector is to meet the estimated investment needs and what challenges Swiss financial institutions face in this regard (see section 3.4).

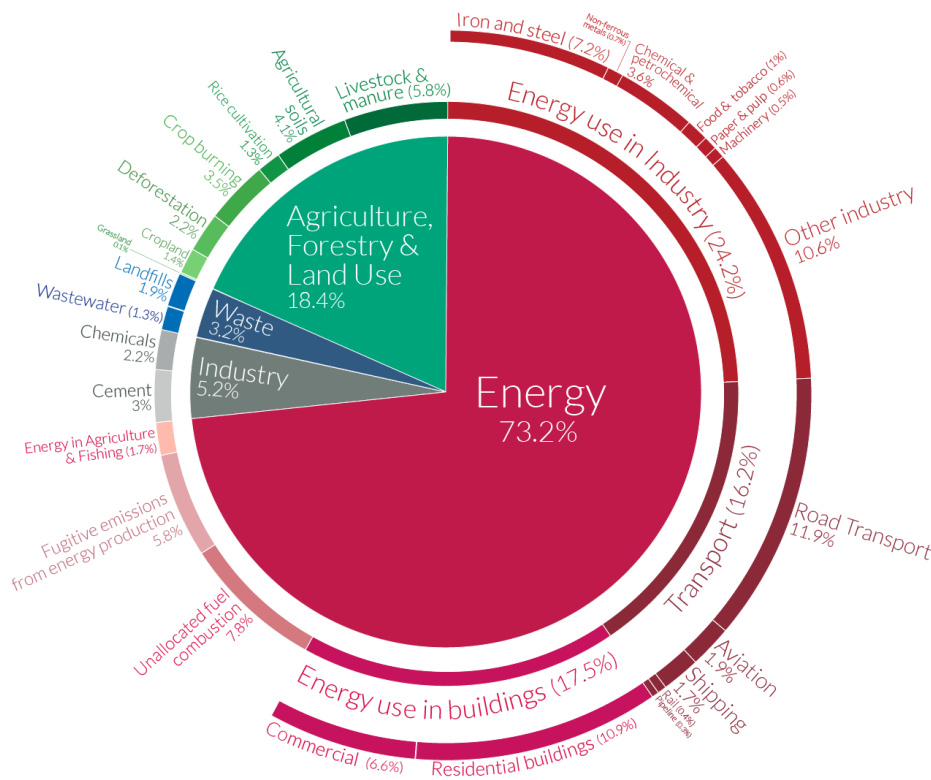
³⁶ SBA & BCG (2021) use the term “substitution costs”.

3.1. Who needs transition finance?

To understand in which sectors the highest investment needs for transition occur, a standard approach is to look at what activities produce the highest GHG emissions. Figure 4 gives an overview of the relative contributions of different sectors to global GHG emissions.

As the chart illustrates, the use of energy is by far the greatest emitter of GHG emissions with nearly three-quarters of global GHG emissions, mainly due to the combustion of fossil fuels in industry, transport, and buildings. While the transport sector often takes centre stage in debates about emission reductions in industrialized countries, it is in fact “only” responsible for around 16.2 % of global GHG emissions.

Figure 4: Global GHG emissions breakdown by sector



Numbers are based on the emissions from the year 2016. All percentages relate to the total GHG emissions by sectors.
Source: OurWorldinData.org, with data from Climate Watch, the World Resource Institute (2020). Licensed under CC-BY by Hannah Ritchie (2020).

Another relevant factor in determining the need for transition finance is how easy GHG emissions can be cut in the respective sector. In the agriculture, forestry, and land use sectors (in a broader sense, all sectors where emissions are not primarily generated through energy use), which amount to 18.4 % of global GHG emissions, technological solutions can mitigate emissions to a much smaller extent than in other sectors. Livestock and manure are large

contributors to global GHG emissions, but technological solutions to significantly curb those emissions are only partially available. A significant decrease in livestock farming GHG emissions would for instance require considerable changes in consumer behaviour (through consuming plant-based meat substitutes, as an example). However, population growth and increasing demand for food and meat add considerable complexity to such a sectoral transition. Hence, agriculture and especially livestock farming face a real challenge in achieving net zero, and additional regulations as well as technological and social innovations will be needed.

Regarding the financing and investment side of the transition, it is important to keep in mind that Figure 4 shows the energy from a usage-based perspective (e.g., where GHG emissions occur). When we think about reductions of GHG emissions in the energy sector, typically only part of the investments is needed on the usage side (in transport for electrical engines, for instance), while the larger part goes into the substitution of fossil fuels with renewable energy sources. This needs to be factored in when interpreting the current estimates for investment needs given in sections 3.2 and 3.3.

Furthermore, as stated before, NET and CCS will likely play a role in achieving net zero, because not all GHG emissions can be completely avoided. It is therefore fair to assume that going forward, investments will have to be explicitly made into such technologies. Due to the relatively low maturity of the associated market and the high uncertainties regarding technological feasibility and practical application, it appears however challenging to estimate the concrete investment needs reliably.

3.2. Estimates for absolute investment needs

Very few global estimates exist for the costs of the transition towards net zero. As a point in case, the IPCC emphasized in their special report 2018 (IPCC, 2018) the “lack of literature specific to 1.5°C on investment costs with detailed breakdown by technology” and the “lack of literature specific to 1.5°C on mitigation costs in terms of GDP and welfare” as key knowledge gaps.

The scarcity of estimates is hardly surprising given the large uncertainties attached to these calculations. When revisiting the far-reaching technological developments that have occurred over the last 30 years, it seems obvious that projecting further technological advances until 2050 is a challenging exercise. In addition, many other important variables, such as geopolitical factors, economic scenarios, and regulatory developments, need to be factored in, making it hard to establish exact numbers.

Finally, **many measures aimed at decarbonizing the economy will come with an increased cost at first but will eventually lead to net profits**, as implied by the term “investment”³⁷. For example, investments in low-carbon infrastructure or electric mobility result in significantly reduced operational costs over time.

On the global level, Figure 5 gives an overview of existing estimates for transition costs. Most of them build in some form on economic scenarios and projections of the OECD and the International Energy Agency (IEA). Estimates across sectors vary considerably between **USD 0.6 to 8 trillion per year**. This is partially due to the variety of assumptions made and the different scopes of the estimates. Most estimates include replacement costs in their projections (or do not make it entirely clear if they are included), while others focus on certain topics, e.g., infrastructure, harder-to-abate sectors, or energy.

Figure 5: Estimates of global investment and finance requirements for the transition

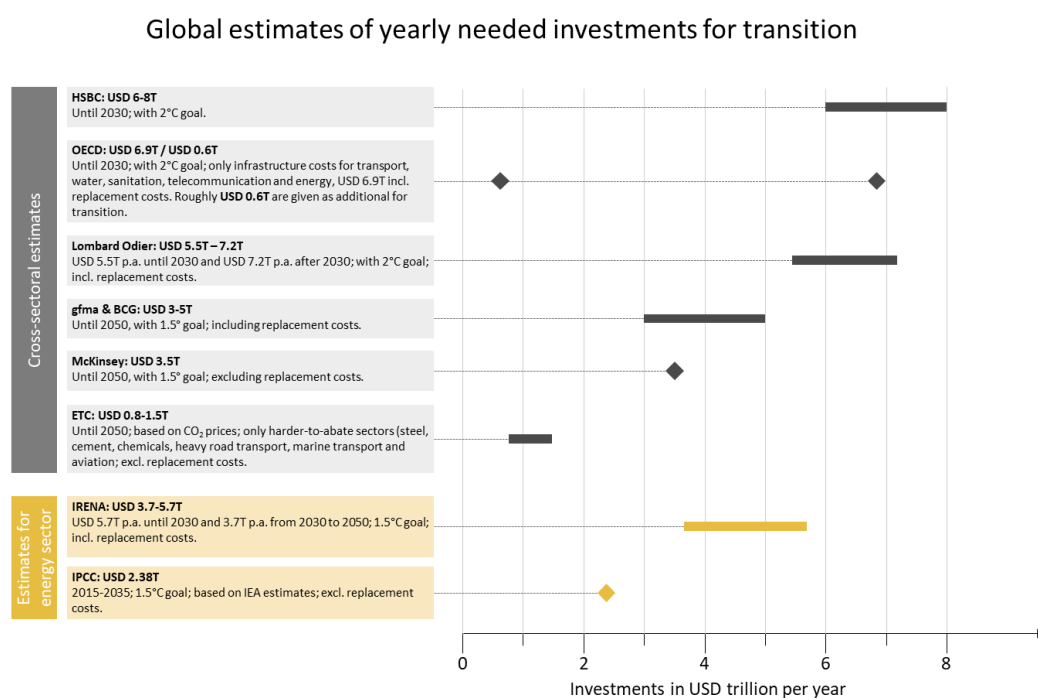


Figure INFRAS. Sources: HSBC (2019); OECD (2017); Lombard Odier (2020); gama & BCG (2020); McKinsey (2021); Energy Transitions Commission ETC (2018); IRENA (2021); IPCC (2018).

³⁷ As a matter of fact, there are always net financial benefits for transition finance in the long term because the economic costs due to climate change are much higher than the transition investments needed (OECD, 2015). It might, however, occur that financial benefits and costs do not accrue for the same party.

The energy sector is the only sector for which multiple global estimates exist. A further breakdown of the energy or other sectors, as done in Figure 4, is rare to find. Only estimates from Gfma & BCG (2020) and the OECD (2017) break-down the costs for specific sectors or use cases (e.g., energy, transport or infrastructure). The estimates by the Energy Transitions Commission ETC (2018) are valuable in that they concentrate on harder-to-abate sectors, which include steel, cement and the chemical industry as well as heavy transport (road, marine and air). A separate estimate exists for the cement industry, derived from the IEA (IEA 2018), which calculates additional transition costs of USD 176 to 244 billion until 2050 to reach the 2°C goal (averaging around USD 5.5 to 7.6 billion per year).

By contrast, there are only rough estimates for CCS investment needs in specific sectors. Gfma & BCG (2020) guess that around USD 3 trillion will be needed for the energy production sector and USD 1.1 trillion in the cement industry from 2020 to 2050. No global estimates exist for the financing need of NET. Since NET and CCS will likely play a role in achieving net zero emissions, the lack of reliable numbers on required investment in these areas appears problematic.

Generally, annual estimates for investments needed at the global level for the transition to net zero **make up between 1 % and 10 % of global GDP**³⁸. While mobilizing this capital will pose major challenges for states and non-state actors, especially in developing countries, financial institutions that capitalize on the resulting opportunities will stand to profit from these investment needs.

Mobilizing the required investment sums will, however, not be equally challenging for all regions of the world, depending on the development of the economy and its dependence on fossil fuel generated power, as well as the maturity of their financial markets. A closer look at the European market with which Switzerland is highly interconnected is given in Annex A4.

3.3. Investment needs for the transition in Switzerland

Before delving into the estimates for transition costs or investment needs in Switzerland, some characteristics of the Swiss market and its attached GHG emissions are worth noting.

The breakdown of Swiss GHG emissions (see Figure 6 below) differs from the global picture in several ways (see Figure 4)³⁹. For instance, the fraction of the transport sector in Switzerland equals 32.2 %, which is nearly twice as much as the global figure of 16.2 %. Furthermore, energy use in buildings (which forms the major part of “Other sectors” in Figure 6) constitutes a considerable larger fraction of Switzerland’s GHG emissions compared to the global breakdown

³⁸ The World Bank and OECD estimate a global GDP of USD 84.7 trillion for the year 2020.

³⁹ Since the focus lies on the domestic GHG emissions and transition needs, emissions arising from the production of imported goods including electricity are not part of Figure 4 or of the estimated investment needs.

(25 % as opposed to 17.5 %). These specifics can at least partially be explained by the fact that in Switzerland less than 2 % of the energy used as electricity originates from fossil fuels (Swiss Federal Office of Energy, 2010), which considerably lowers the absolute emissions for energy consumption. The transport and the building sectors, however, still use a major proportion of their consumed energy via the direct combustion of fossil fuels through combustion engines, oil and natural gas heaters. Owing to its high purchasing power, Switzerland also boasts a relatively high number of cars per capita, many of which are SUVs or sports-cars with higher GHG emissions than regular passenger cars.

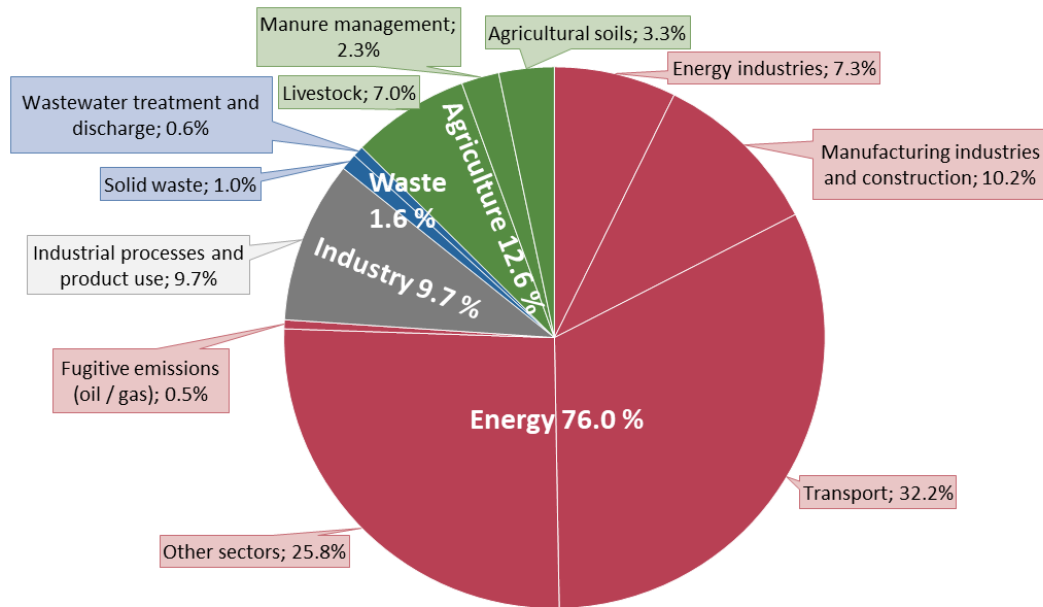
Furthermore, Switzerland exhibits considerably lower fractions of GHG emissions from agriculture, forestry and land use, despite comparably high methane emissions from cattle farming. This is mainly due to the fact that GHG emissions from land use, land use change and forestry (LULUCF) are negative in Switzerland (FOEN, 2020), forming in fact a net GHG sink⁴⁰, and that there are no significant GHG emissions from rice cultivation or crop burning.

It should be noted that **the carbon footprint of the largest companies operating in Switzerland** particularly in the harder-to-abate sectors cement, steel and chemicals, as well as natural resources and mining **is largely accrued abroad** and is thus not included in national statistics nor in sectoral breakdowns (Figure 6)⁴¹. The impression of comparably low domestic GHG emissions is flawed further by the fact that emissions from the production of imported goods and services are not considered in the official statistics. This is particularly relevant for sectors and subsectors where Switzerland is not self-sufficient, e.g., food production, apparel, raw materials, electronic devices etc.

These limitations should be borne in mind when interpreting the estimates for investment needs further below, as they only reflect the domestic transition and ignore the investment needs for the transition in regard to supply chains and cross-border business. Measures to effectively finance the transition towards net zero should therefore account for both domestic emissions as well as supply chain emissions from operations abroad and imported goods and services.

⁴⁰ Mainly forest biomass slightly increased in the last years, which results in a net negative GHG emission value.

⁴¹ An example would be Holcim, a Swiss company, which exhibits total Scope 1 CO₂ emissions, which are nearly three times the domestic emissions of Switzerland (FOEN, 2020; Holcim, 2021).

Figure 6: Swiss GHG emissions breakdown by sector

Numbers are based on the Swiss domestic emissions from the year 2019.
Figure INFRAS. Source: FOEN (2021).

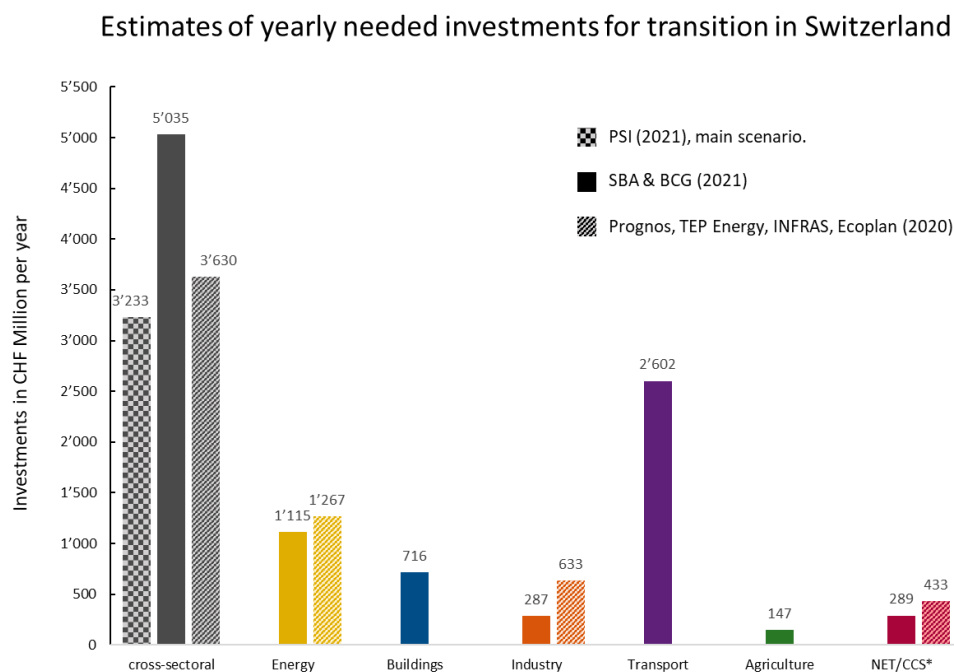
3.3.1. Absolute estimates of needed investments

According to recent studies

There are three main sources for estimates of investment needs for the transition in Switzerland: The energy perspectives 2050+ (“Energieperspektiven 2050+”; Prognos, TEP Energy, INFRAS & Ecoplan, 2020), a scientific publication by the Paul-Scherrer Institute (PSI; Panos et al. 2021) and a recent report by the Swiss Banking Association (SBA) and Boston Consulting Group (BCG) focussing specifically on investment needs to reach net zero by 2050 (SBA & BCG, 2021).

Figure 7 details these estimates, including a sectoral break-down. Compared to global and EU figures, the existing estimates for Switzerland show less variation, ranging from around **CHF 3.2 to 5.0 billion per year**. What they all have in common is that they consider only additional investments and no replacement costs.

Figure 7: Estimates of investment and finance requirements for the transition in Switzerland



All values are calculated based on additional investments, i.e., no replacement costs are included in the given estimates. PSI (2021) and Prognos, TEP Energy, INFRAS, Ecoplan (2020) calculate net investments, while SBA & BCG (2021) show gross investments. All estimates are based on a net zero until 2050 scenario. *Note that in the SBA & BCG (2021) source, the investments for CCS technologies are including the energy and industry sectors but are shown here separately for illustrative purpose. If no number is indicated, there is no distinct estimate for the respective sector/technology available (it does not mean that there is no investment and financing need).

Figure INFRAS. Sources: SBA & BCG (2021); Panos et al. (2021); Prognos, TEP Energy, INFRAS, Ecoplan (2020).

Similar to the global and EU level, the investment needs for the energy sector form an important part of the overall investment needs but are less accentuated with around 20 % to 30 % of the total investment needs. Comparably more important in Switzerland are the fractions of investments needed for buildings, industry and transport, illustrating the specific characteristics of the Swiss economy as outlined in section 3.3. However, the estimates for the transport sector differ significantly. The high investment needs for the transport sector as estimated by SBA & BCG (2021)⁴² stand in sharp contrast to the forecasted numbers in the Energy Perspectives 2050+ (Prognos, TEP Energy, INFRAS & Ecoplan, 2020). The reason for this disparity is that the latter is based on net differential investments (i.e., cost savings are subtracted from the investment volume), resulting de facto in net profits due to decreasing energy costs.

⁴² This study applies a largely identical methodology for deriving the estimates as the study by gmfa & BCG (2020), which formed part of the global and EU estimates (see sections 3 and A4 and specifically Figure 10).

Interestingly, SBA & BCG (2021) and Prognos, TEP Energy, INFRAS & Ecoplan (2020) contain estimates for the necessary investments into NET and CCS. Investment needs are estimated to hit around CHF 289 (only CCS) to 433 million (NET and CCS) in average per year until 2050, with highest investment volumes arising in the first years and declining until 2050.

Friot & Vionnet (2021) apply a different approach to calculating the costs for the transition. They analyzed the costs of possible decarbonization solutions for the largest 14 industrial companies in Switzerland, including their supply chains.

Their estimate resulted in annual investment needs of CHF 28 billion to achieve net zero along the supply chains of these 14 companies (compared to CHF 5 billion or less for Switzerland, as shown in Figure 7). These costs would not only accrue at the companies themselves, but also at the companies in their supply chains. Further, the study also expects cost savings due to these investments in the range of CHF 34 billion per year, which would be distributed among many different stakeholders (not even necessarily part of the supply chain). Given their choice to include Scope 1, 2 and 3 emissions, the results from Friot & Vionnet are not directly comparable to the other figures.

Insights from the interviews

The interviewees made qualitative rather than quantitative statements on the additional investment needs for the transition, with one interlocutor pointing out the existing SBA & BCG (2020) study⁴³.

In general, the **interviewed financial institutions estimated the additional investment needs for Switzerland to be rather small (four of ten) or medium (five of ten)**⁴⁴. Medium in this context can be understood as a considerable investment need, which would however not pose substantial challenges to the Swiss capital market. It was further pointed out that bigger financing difficulties were expected in countries with higher absolute GHG emissions per capita, explicitly also in the EU. Two of the interlocutors even stated that they consider the available capital in Switzerland from private and institutional investors to be much greater than the actual possibilities to invest into the transition. Overall, it can be summarized that even though investment needs for transition exist and will likely grow in the future, they do – at least for now – not constitute an investment or financing gap in Switzerland.

3.3.2. Readiness of the Swiss financial sector

To assess the readiness of the Swiss financial sector for the transition, the estimates for the investment needs in Switzerland can be contextualized by comparing them to other investment

⁴³ Note that this specific institution was the only one to be interviewed after publication of the SBA & BCG (2021) study.

⁴⁴ Only one of the interviewees expects additional investment needs for the transition to be very large.

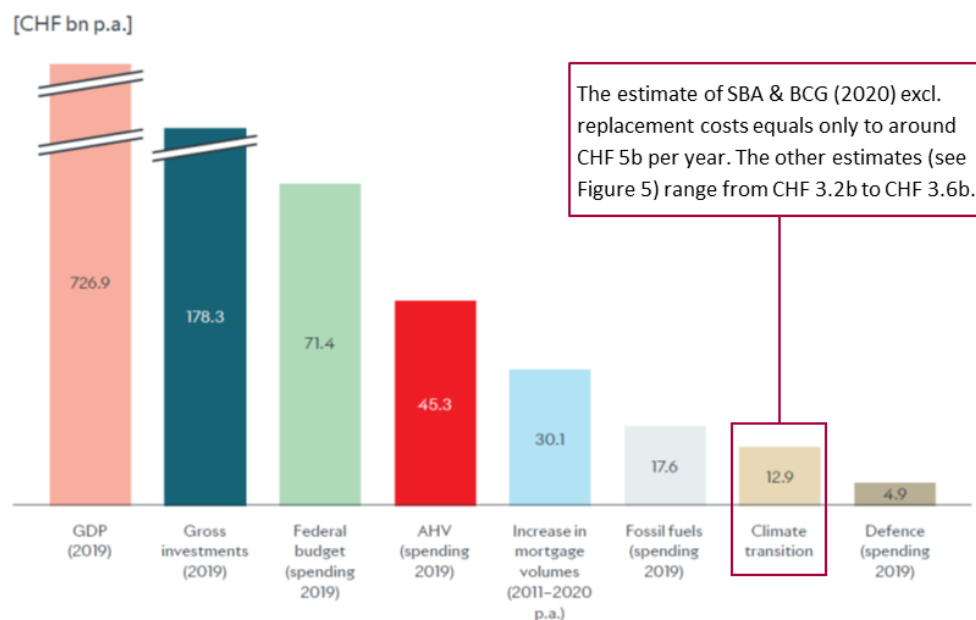
volumes and financial figures in Switzerland, as done by SBA & BCG (2021) and shown in Figure 8⁴⁵.

Considering the additional investment needs alone without replacement costs, the total sum appears to be in the range of the combined defence (CHF 5.1 billion) or the agriculture (CHF 3.7 billion) budgets of Switzerland for the year 2021 (Swiss Federal Finance Administration, 2021). The estimated additional investments needs thus vary between 0.44 % and 0.7 % of the Swiss GDP (year 2019) and between 1.8 % and 2.8 % of the gross investments made in Switzerland. Both shares are considerably lower than in the EU and globally, meaning Switzerland will have to invest a smaller part of its economic output into the transition than other countries. Therefore, challenges in mobilizing and raising the capital needed, especially in the context of the strong Swiss financial market, will probably be much smaller than in the EU and other regions of the world.

This is in line with findings from a PSI study (Panos et al. 2021) and SBA & BCG (2021) that the bulk of the additional investments in Switzerland can be covered by the financial sector. The remaining fraction constitutes investments, which are economically not viable to date or bear too much risk to be considered attractive by banks. It is **this remaining fraction of investments** (around 17 % of the needed investments according to SBA & BCG (2021)), **which is likely to stand at the core of the challenges for financing the climate transition.**

⁴⁵ The comparison of SBA & BCG (2021) includes replacement costs, which could be argued to be included in “gross investments” as well.

Figure 8: Comparison of Swiss net zero investment volumes for the transition



Source: SBA & BCG (2021), figure slightly modified.

Based on the estimates and studies at hand, it can be projected that the amount of financing and investments needed for the transition per se is not a major challenge for the Swiss financial sector. Rather, there are other parameters, which pose difficulties to financial institutions. This conclusion is supported by the majority of interviewed financial institutions (six of ten), acknowledging that the Swiss financial market is generally well prepared for financing the transition. Only three out of ten contested this view, advancing other reasons to support their assessment (further insight on these reasons will be given in the following section).

3.4. Challenges for the Swiss financial sector

As indicated by a review of the relevant literature, only a smaller fraction of the investments needs in Switzerland are believed to face finance constraints. While the conducted interviews broadly confirmed this finding, they revealed additional challenges that are more structural in nature.

The following sub-chapters aim to highlight the specific challenges for Swiss financial institutions related to transition finance and the investments needed, based on interviews and available literature.

3.4.1. Unfavourable risk-return profile

Since the transition to net zero inevitably comes with uncertainties and many unknowns, financial risks for investments into the transition are usually larger than into mainstream business practices (Agora Energiewende, 2018; Painuly, 2001). Specifically, technological but also regulatory or profitability risks (see below) can considerably reduce creditworthiness of investees, making them unattractive for banks to invest in. This is also mirrored in the opinions of the questioned financial institutions.

Only three interviewees stated that the Swiss financial market was fully capable to cope with the specific risk-return profile of transition financing and the corresponding investment needs – while one of the three further explained that s/he expected this capacity to vanish in the future. Four of the interviewees indicated that the financial market today was not aligned with the higher risk-return profile of brown assets. Similarly, the SBA & BCG (2021) echoed that the investments, which cannot be financed by the financial sector according to their findings, are particularly long-term or high-risk projects.

In practice the risks of long-term investments, e.g., in renewable energy technologies are often hard to assess for financial institutions (Lehmann & Söderholm, 2017). Since the transition of the economy is connected with many long-term investment needs, this issue is of particular relevance. Some of the interviewed financial institutions pointed out that the main objective of transition finance policies should therefore be to reduce the risks for transition investments. According to one of the interviewees, a societal discourse on who should bear the financial risks of financing the transition towards net zero is needed. If the financial risks for financial institutions and investee companies to achieve the transition in time remain too high, it might be necessary for the public authorities to take regulatory measures or create positive incentives to reduce these risks.

Egli et al. (2018) argue that policy support to ensure favourable framework conditions for transition investments, especially renewable energy technologies, is needed to secure investor confidence and improve the risk-return profile of such investments. Policy intervention may also be necessary to balance the trade-off between financial risks for investors and climate risks for society. Not taking or slowing down efforts for the transition because of financial risks might increase climate-related risks and ultimately amplify financial risks for the society as a whole. Therefore, it is important in future discussions to agree on which financial risks should be taken on by financial institutions, the state, or private entities and individuals.

3.4.2. Uncertain regulatory environment

Environmental and sustainable finance regulations play an important part in the policy response to manage the transition to a net zero economy, yet both face numerous uncertainties

about their future development. While environmental regulation, e.g., agricultural or cleantech subsidies, CO₂ pricing or phasing-out policies of fossil fuels, has a more direct effect on the transition, it is primarily relevant for the actors in the real economy. In contrast, sustainable finance regulation has a more indirect effect on the transition but gathers more attention from financial enterprises, which also ensues from the interviews. To maximize the effectiveness of the policy response, advances in both environmental and sustainable finance regulations are necessary due to the connectedness between the real economy and the financial sector.

In the area of sustainable finance, there is a continuously growing body of regulations for mandatory non-financial disclosures and common standards in the EU, while in Switzerland hardly any sustainable finance specific regulation exists to date⁴⁶. Still, effective climate mitigation policies are becoming more urgent (IPCC, 2021) and the pressure from the civil society and the scientific community on policymakers to take decisive action is constantly increasing.

Against this backdrop, many interviewed **financial institutions expect the regulatory environment for them to become more stringent and complex**, both in the EU (mainly relevant for the larger, international Swiss banks) and in Switzerland. Two of the Swiss financial institutions voiced their concern about the unclear future regulatory framework (explicitly mentioning CO₂ prices) and identified uncertainty as a key challenge for transition finance.

In this context, three of the interviewees (as well as the SBA & BCG, (2021) study) suggested adequate CO₂ pricing as an effective policy instrument to drive climate mitigation and transition efforts. While such legislation would hardly affect financial institutions directly, it would surely improve the risk-return profile of companies engaged in activities that face competition from cheaper “brown” alternatives⁴⁷. With the rejection of the revised CO₂ Act, an expansion of Switzerland’s existing carbon pricing mechanism is, however, most probably off the table for some time and effective alternatives will have to be found.

3.4.3. Measuring impact

Another challenge for financial institutions pertains to measuring the impact of their actions, investment, or financing decisions on corporate sustainability improvement. This can undermine the credibility of financial institutions' transition efforts, as their contribution to the sustainability improvement of the investee companies is hard to quantify. Measuring the sustainability impact of financial product and services has become a subject of extensive research, but

⁴⁶ This mainly includes the disclosure and due diligence obligations resulting from the counterproposal to the Popular Initiative for responsible businesses, which will have to be applied from financial year 2023 onwards (<https://www.bj.admin.ch/bj/de/home/aktuell/mm.msg-id-86226.html>). On the other hand, the Swiss Financial Market Supervisory Authority (FINMA) has obliged banks to systematically disclose climate-related financial risks per 1 July 2021, and the Federal Council has declared to make TCFD aligned climate reporting mandatory for large Swiss companies (<https://www.finma.ch/de/news/2021/05/20210531-mm-transparenzpflichten-zu-klimarisiken/> and <https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-84741.html>).

⁴⁷ Examples involve CCS, NET or alternative fuels (especially also for aviation).

no common approach has yet emerged in the financial market. This absence is particularly true for purpose-driven and use-of-proceeds products such as Sustainability Linked Loans (SLL) and Sustainability Linked Bonds (SLB) or green bonds.

Additionally, eight out of ten interviewees stated that, irrespective of some very specific products, their sustainability/ESG strategy comprises active engagement with their customers or investees as well as exclusion/divestment approaches⁴⁸. However, **the measurement and attribution of the resulting impact remains a major challenge** in all these cases. To a large extent this is linked to the difficulty in establishing causality between the investment and financing decisions and the observed changes at the company level. It is in most cases hard to demonstrate whether companies reduce their carbon footprint because of a shareholder's active ownership, a change in interest rates or market conditions or simply because of an internal management decision.

3.4.4. Further challenges, needed products and actors

Further challenges have been signalled by our interlocutors that are not limited to transition finance specifically but are often seen in the context of sustainable finance more generally. These challenges include the proper training, education, and knowledge transfer of and between employees, customers and investors on sustainability topics. Furthermore, access to important private equity and private debt transition investment opportunities is largely restricted to professional or institutional investors.

Further, according to one interviewee, it appears much harder to communicate transition finance opportunities to retail clients, who often prefer green investment opportunities over brown and transitioning ones.

Even though eight of the ten interviewed financial institutions recognized one or more of the specific challenges for transition finance outlined above, only one of these interviewees acknowledged the need for specific transition finance related products (e.g., further credit products such as green mortgages or transitional bonds). In contrast, three of the ten interviewees mentioned that they deemed the available products to be sufficient for the current demand from investors and clients – with the notation that this might change in the future.

⁴⁸ Which in most cases includes, but is not limited to, climate-related activities, considered to becoming stranded assets. These includes to date mainly coal mining (Swiss Sustainable Finance, 2021: https://www.sustainablefinance.ch/upload/cms/user/2021_06_07_SSF_Swiss_Sustainable_Investment_Market_Study_2021_E_final_Screen.pdf).

4. Transition finance and the real economy

Since a large portion of all GHG emissions accrue in the real economy, meaning that both emission reductions and technological innovation must happen there, this chapter will focus on the challenges of the transition perceived by the real economy.

Besides high proportions of emissions stemming from transport and real estate, industrial emissions, both direct and from energy use, are highly relevant and make up around 20 % of Switzerland's domestic GHG emissions (see Figure 6).

It is **in the harder-to-abate sectors** where **the challenges for the transition are most pronounced** (see chapter 1.1 and Figure 2). Emission intensities in these sectors are currently very high and technological pathways to achieve net zero are still largely unknown and often tied to large-scale application of CCS and/or NET⁴⁹.

Thus, in the following chapter 4.1, challenges in the three harder-to-abate sectors, cement, steel, and chemicals are highlighted based on the examples of Holcim, Steeltec and BASF. Chapter 4.2 will then revisit more generally challenges of Switzerland's real economy, including SMEs, which often stay out of the spotlight given the relatively low GHG emissions.

4.1. Challenges in the harder-to-abate sectors

4.1.1. Cement sector on the example of Holcim

The cement sector is directly responsible for around one-quarter of all global industrial emissions (IEA, 2018) and around 4 % to 5 % of global (BCG & gfma, 2020) and Swiss (cemsuisse, 2021) GHG emissions, respectively. Two-thirds of these emissions originate from the chemical process of decomposing limestone to create clinker, an important component of cement. Only one-third of the emissions is attributable to the actual combustion of fuels for energy production.

Therefore, increasing energy efficiency and substituting fossil fuel energy with renewable energy can mitigate only a limited fraction of the emissions. As a result, one of the main challenges in the cement sector lies in the process of clinker production and the potential reduction of clinker in cement products.

Innovative technology is needed to overcome these challenges in the cement sector. The IEA (2018) Technology Roadmap lists five key levers to reduce GHG emissions:

- Improving energy efficiency.
- Switching to alternative fuels: since thermal energy is needed, this mainly includes biomass or waste materials as fuels.

⁴⁹ To date the application scale is still very small, rarely cost-effective and under debate (see also chapter 1).

- Reducing the clinker to cement ration: This is a large area of research, where a lot of progress has been made already, but which continues to be important for further improvements.
- Integrate CCS into the manufacturing process, at the cost of lowering energy efficiency.
- Alternative binding materials: this is another large area of research with a lot of innovation happening currently, but challenges in regard to profitability/pricing and scalability remain. Moreover, there is no robust life-cycle assessment for such alternative binding materials, making it difficult to conclude on their potential climate impact⁵⁰.

Additionally, recycling and reuse of construction waste continue to be a major focus in the efforts to reduce emissions.

Last but not least, regarding the construction and building sector, the insulating properties of cement are also important since the real estate sector exhibits a huge GHG emission footprint, particularly in Switzerland. 7.69 million t CO₂eq or 17 % of domestic emissions alone are attributable to the emissions of private households, while there are considerably more emissions to add from commercial real estate and construction. In sum, this results in roughly 33 % of all domestic GHG emissions by the real estate sector (FOEN, 2021). Cement is thereby relevant both directly in the construction process but also has an important role in increasing the energy efficiency of buildings.

The IEA (2018) projects additional annual net investments for the cement sector of USD 8.1 to USD 10.6 billion globally between 2015 and 2050 in a 2°C warming scenario, compared to a no-action scenario. BCG & gfma (2020) suggest around USD 50 billion in annual investments to completely decarbonise the cement sector (even if no clear pathways exist for a complete decarbonisation). The largest fraction of these investments is attributed to CCS application, with around USD 37 billion estimated necessary investments.

For Switzerland, the SBA & BCG (2021) study estimates investments of around CHF 87 million per year (excluding replacement costs). The fraction of investments into CCS is thereby very high, with estimated CHF 71.6 million per year.

Box 6: Case study Holcim⁵¹

Holcim is the largest cement producer in the world, with headquarters situated in Zug/Switzerland. The group is active in more than 70 countries and thus emissions accrue largely

⁵⁰ Further, there are innovative research projects going on to store CO₂ in cement. <https://ethz.ch/de/news-und-veranstaltungen/eth-news/news/2020/08/kohlendioxid-binden-mit-betonbruch.html>.

⁵¹ Before May 2021 known under LafargeHolcim.

abroad and in the supply chain of the company. To estimate investment volumes needed for Holcim, the global estimates (see above) for the investment needs in the cement industry seem more fit-for-purpose as a reference point than the corresponding Swiss estimates.

Holcim has been a forerunner in regard to the transition in the cement sector with globally one of the lowest carbon intensities per ton of produced cement (Inrate ESG Impact Data, 2022) and with far-reaching commitments and plans to reduce GHG emissions. It is the first company in the cement sector to have validated near- and long-term science-based targets⁵², including net zero emissions by 2050.

Transition plan

For the transition towards net zero and to achieve the set reduction goals, Holcim has developed a transition plan (Holcim, 2021a; Holcim, 2021b) with the following cornerstones:

- Targets: Science based targets for 2030 and 2050. Net zero by 2050.
- Technologies and research:
 - Carbon capture technologies, alternative fuels, green cement products (e.g., with reduced share of clinker or increased share of recycled material in it to reduce the scope 1 and 2 emissions).
 - Sustainable construction and smart building designs to reduce the needed material altogether and to increase energy efficiency of buildings, which leads to a reduction in the scope 3 emissions.
- Strategic acquisitions: Part of the strategy is also to expand the business with acquisitions of low-carbon construction materials, as done in 2020 with the acquisition of Firestone Building Products, which mainly produce roofing and thermal insulation products.

In the recently published strategy 2025 (Holcim 2021c), the company further elaborates on the strategic goals of future acquisitions, which is directly related to the group's transition efforts: The "solutions & products" segment, which currently only accounts for around 8 % to company net sales, is set to grow to 30 %. Thus, part of the strategy is also to increase those parts of the business, which are not related to cement and leading to a decreased dependency on cement overall.

Financial instruments used

In November 2020, Holcim issued its first sustainability-linked bond with a volume of EUR 850 million (Holcim, 2021d). The linked performance target equals an emission intensity

⁵² <https://sciencebasedtargets.org/companies-taking-action>

of 475kg CO₂ per ton of cementitious material by 2030. At the time of issuing, the emission intensity amounted to around 550kg CO₂ per ton.

The bond has a comparably low coupon of 0.5 %, resulting in favourable financial terms for Holcim (most other bonds by Holcim have nominal interest rates of 1 % to 8 %), if the linked target is met. It does, however, face a coupon step-up of 0.75 %, if the target is missed. This sustainability-linked bond constitutes roughly 10 % of all issued bonds by Holcim (Holcim, 2021d).

Additionally, Holcim has linked the costs of all committed bank facilities to its ESG performance and established a programme for issuance of EUR 3 billion in ESG notes, resulting in sustainability-linked agreements of close to CHF 6 billion in total (Holcim, 2021d).

Risks and challenges identified by Holcim

The largest challenges and risks in terms of climate transition as reported by Holcim are related to policy and regulation, technology, and markets (Holcim, 2021d):

- **Policy and regulation:** climate policy frameworks have developed, but further projections are difficult. Holcim expects overall an increase in costs for emitting CO₂, which would in turn drive competitiveness for low-carbon products. Due to the globalised market, it is crucial for Holcim – and the incentivisation of investments into low-carbon technologies and innovation – that a level-playing field is created among the varying regional markets.
- **Technology:** Holcim acknowledges the fact that the costs of the technologies necessary for the transition might be significantly higher than the costs of (current) carbon pricing mechanisms. Consequently, Holcim might be dependent on further incentivisation for emission reductions.
- **Markets:** Here, the main challenges perceived by Holcim are that on the one hand, cementitious products might overall be less demanded by customers due to the high-carbon intensity, but also that if policies fail to incentivise low-carbon products, customers would not be willing to pay for low-carbon alternatives (within cement products).

4.1.2. Steel on the example of Steeltec

The steel sector is responsible for around 6 % to 7 % of global GHG emissions (see Figure 4; BCG & gfma, 2020; Mission Possible Partnership 2021). The bulk of the GHG emissions stems from the enormous amount of energy needed to reduce iron ore and smelt iron and steel.

One of the main levers to reduce emissions is thus to substitute fossil fuels with low-carbon hydrogen as a fuel for the furnaces. Further levers for the steel sector to achieve net zero in 2050 are given by Mission Possible Partnership (2021):

- Increase the scrap recirculation, productivity of steel use and material efficiency of steel to minimise the need for primary crude steel. This could reduce the demand for primary crude steel by 40 % compared to a business-as-usual scenario.
- Use of bioresources⁵³ might help to decarbonise the steel sector, but the study acknowledges that a decarbonisation might be possible with not more than 2 % of the total global supply of such bioresources.
- CCS technology will be necessary to further reduce emissions.
- The share of direct reduced iron (DRI) steelmaking facilities should increase drastically over the blast furnace - basic oxygen furnaces (BF-BOF). This requires, however, larger volumes of pure iron ore than are available to date.

One of the main challenges in the steel sector is the dilemma between short-term and long-term profitability. While swift investments into DRI steelmaking, use of hydrogen gas and deployment of CCS are required and would lead to a considerable competitive edge of decarbonised steel over business-as-usual steel after 2030, all these measures are not yet cost-effective and require large up-front investments. Furthermore, the competitive use of hydrogen steelmaking requires significant decreases in the price of near-zero hydrogen, which are not expected to happen sufficiently soon.

The Mission Possible Partnership (2021) estimates additional annual net investments of USD 6 billion globally until 2050 to achieve net zero, compared to business-as-usual - an increase of roughly 20 %. BCG & gfma (2020) calculate around USD 96 billion in annual investments to completely decarbonize the steel sector. The largest fraction of these investments can be attributed to natural gas application (coupled with the expansion of DRI steelmaking, as BF-BOF do not work with natural gas) with estimated necessary investments of around USD 33 billion. Yet, the steel industry is largely dependent on other additional investments, e.g., in infrastructure, electricity generation and hydrogen gas technology.

For Switzerland, the SBA & BCG (2021) study estimates annual investments of only CHF 3.1 million per year (excluding replacement costs) to replace fossil gas with biofuel. However, this estimate is of limited significance as Switzerland does not host any primary production of iron or steel from ore, and the only two existing steel plants for smelting already use electric arc furnaces.

⁵³ In particular biogas (methane).

Box 7: Case study Steeltec

An example of a steel company in Switzerland is Steeltec. As a member of the Swiss Steel Group, they operate in five countries: Switzerland, Germany, Turkey, Sweden, and Denmark. Steeltec states that they are aware of their responsibility towards the environment and society especially in the light of Switzerland's climate goals for 2050.

Transition plan

The Swiss Steel Group's expressed goal is to be as environmentally friendly as possible by committing to an efficient use of resources, energy efficiency, recyclability of products and by minimizing emissions. They have however not published a transition plan. Related information found on their website and corporate social responsibility report includes:

- **Targets:** Since 2019, the Swiss Steel Group has been working on key issues, figures, and targets for environmental and resource management themes (Swiss Steel Group 2021). However, Steeltec has yet to publicly disclose quantitative targets or a transition plan. In terms of qualitative targets, they aim to generally lower the amounts of waste produced and reduce the emission of greenhouse gases, nitrogen oxides and dust as much as technically possible.
- **Technologies and research:** Exclusive scrap-based steel production (Swiss Steel Group 2021), new walking beam furnace, waste heat utilization in rolling mill, optimization of hydraulic pumps and compressors⁵⁴.

Financial instruments, risks and challenges

The Swiss Steel Group including Steeltec reports neither on financial instruments used nor on risks and challenges.

4.1.3. Chemicals/plastic on the example of BASF

The (petro-)chemical sector is responsible for around 4 % to 6 % of global GHG emissions (see Figure 4 and BCG & gfma, 2020) and is the largest consumer of oil and gas (WEF 2021a). Here, scope 1 and 2 emissions are two-fold: On the one hand, many chemical reactions need heat and thus energy. On the other hand, particularly fossil fuel-based chemical products (i.e., most chemicals) can themselves result in CO₂ release in the chemical production process.

⁵⁴ <https://steeltec-group.com/en/sustainability/services-2-3-2>

Additionally, the sector features massive downstream scope 3 emissions, as most products release CO₂ when used (e.g., fuels) or disposed (e.g., plastic).

While demand for refined fuels is expected to decline strongly over the next decades, demand for other basic chemicals such as plastic, ammonia and methanol, which are all fossil fuel based, is projected to increase. Therefore, the decarbonization of the chemical sector must be tackled from different angles. IEA (2021) and BCG & gfma (2020) list the following main actions to be taken to achieve net zero:

- Use alternative fuels and renewable electricity to cover the energy demand.
- Use alternative feedstocks as basis for the chemical reactions, wherever possible. An example would be the production of hydrogen through electrolysis from water (“green hydrogen”), instead of steam reforming of natural gas (“grey hydrogen”) or other light fossil hydrocarbons.
- Increase energy efficiency in process and usage of chemical products. This concerns in particular heat recovery and transfer of thermal energy used for the chemical reactions.
- Similar to the cement and the steel sector, chemicals are dependent on CCS technology to achieve net zero.
- Last but not least, when it comes to plastic, circular approaches, substitution, avoidance, and recycling of used plastics are an important step to further reduce emissions (mainly scope 3). Many technological advances have been made in this context, but there is still a need for extensive upscaling both in terms of plastic types and absolute volumes.

Another challenge faced by the chemical sector is the provision of massive amounts of near-zero hydrogen to sectors that depend on this hydrogen to achieve their own net zero targets. This, in turn, enhances the large investment needs in the chemical sector while at the same time generating new and growing revenue streams and thus business opportunities.

BCG & gfma (2020) estimate around USD 73 billion in annual investments to completely decarbonise the chemical sector until 2050. The largest fraction of these investments is attributed to CCS technology, similar to the cement sector, with expected annual investment needs of USD 36 billion. The application of renewable feedstocks for chemical production is equally expected to need high annual investment volumes of USD 30 billion. Here, a lot of investments will still be required for research and development. Furthermore, beyond purely monetary considerations, the volumes of feedstock needed might also lead to considerable supply chain constraints and/or be in conflict with renewable feedstock need for other industries (e.g., nutrition).

For Switzerland, the SBA & BCG (2021) study estimates annual investments of around CHF 196.7 million per year (excluding replacement costs), mainly for the expansion to

alternative fuels and feedstock materials, as well as CCS technology. In contrast, improvements of energy efficiency play a smaller role. Hydrogen production plants are expanding only very slowly in Switzerland, due to regulatory hurdles and a lack of expertise in the Swiss chemical sector.

Box 8: Case study BASF

BASF Switzerland is part of the international BASF group, the worldwide largest chemical company. The following elements are derived from the BASF group's publicly available information.

Transition plan

In 2021, BASF group has published its «Roadmap to climate neutrality» (BASF 2021). In this roadmap, they lay out their transition plan:

- **Targets:** Intermediate target of reducing 25 % of emissions until 2030 compared to 2018, based on Scope 1 and 2 emissions. Net zero by 2050.
- **Technologies and research:**
 - Increasing the share of renewable energies in global power supply.
 - Power-to-steam: Electric heat pumps to generate CO₂-free steam from waste heat.
 - Bio-based feedstocks to replace fossil raw materials.
 - Continuous improvement processes for existing plants.
 - **New technologies:** Electrically heated steam cracker furnace for the production of basic chemicals, processes for the production of hydrogen such as methane pyrolysis and water electrolysis and processes for the production of methanol, CCS. As part of the World Economic Forum's Collaborative Innovation for Low-Carbon Emitting Technologies (LCET), BASF is in the lead for Electrification, one of the initiative's five parallel technology clusters (WEF 2021b): Carbon Capture Utilisation, Biomass Utilisation, Electrification, Alternative Hydrogen Production and Waste Processing.

Financial instruments used

The successful implementation of their transition plan requires investments and financing, which is why BASF...

- ...plans to invest up to €4 billion until 2030.
- ...is trying to secure funding from European and national programs such as IPCEI (Important Projects of Common European Interest).

- ...published their first green bond in 2020 to finance sustainable projects and the development of sustainable products. It has a term of seven years, a volume of €1.0 billion and an annual coupon of 0.25 %.

Risks and challenges identified by BASF

Even if the financing needs are covered, BASF acknowledges the following challenges for the transition:

- The transformation of the chemical production is dependent on renewable electricity being reliably available in large quantities at competitive prices. This is not yet the case in many countries.
- In general, many of new technologies are not yet competitive under today's framework conditions, due to higher operating costs and additional investments. For an economically successful transformation, all players involved must work together. According to BASF, this requires new cooperation models between industry and policymakers for positive, outcome-oriented regulations while preserving the international competitiveness and making sure that consumers accept higher prices for CO₂-free products.

4.2. Main challenges in the real economy

Many challenges to achieving net zero are very pronounced in the harder-to-abate sectors but equally apply to most other sectors of the real economy. In this context, a special focus should be placed on SMEs as they exhibit some specific challenges (Box 9).

4.2.1. Technological challenges

These apply in principle to all companies with complex production processes but are particularly evident in the harder-to-abate sectors (see above). As the definition of harder-to-abate sectors implies, there exist no clear technological pathways to date to reach net zero. Even though many technological developments are underway and some decarbonisation measures are already known, **there is still a massive amount of technological advancement, not least in the area of CCS, needed to align the harder-to-abate sectors with net zero.** Technological progress is also partially hampered by the current lack of profitability and limited market demand (see below).

4.2.2. Profitability

Many factors influence the fact that investments into the transition are simply not economically viable to date. Adjusting complete production processes or developing new technologies is costly, risky, and time-consuming. Furthermore, as a prerequisite for profitability, **market**

demand for low-carbon products needs to match the currently higher costs. This leads to the dilemma that, on the one hand, short-term investments are crucial for the transition as they boost technological advancements and accelerate the shift towards net zero, ultimately leading to better profitability of the respective companies in the long term. On the other hand, these investments negatively affect profitability and free cash flow in the short term, leading to reduced competitiveness. This short-term competitiveness is, however, equally essential to prevail in the market.

Consistent international regulation (particularly on carbon pricing) is typically seen as the most important step in all high-emitting sectors, particularly the harder-to-abate sectors, to incentivise investments into the transition by increasing competitiveness of low-carbon products as opposed to high-carbon alternatives (see 4.2.6).

4.2.3. Infrastructure

Heavy industries are largely dependent on infrastructure that can support their transitioning efforts. For instance, the increased demand for hydrogen as fuel as well as for electricity instead of fossil fuels will need to be addressed by investments into the respective delivery infrastructure. This also includes completely new infrastructure for the transport of hydrogen and CO₂.

4.2.4. Interdependencies

The cross-linking between different economic sectors adds further complexity to the transition. For instance, the steel sector requires massive amounts of net zero hydrogen from the chemical sector, which in turn requires infrastructure and innovative technologies from potentially other sectors as well as net zero energy from the utilities sector in order to produce this hydrogen. Such interdependencies constitute both a challenge and an opportunity: While slow advancement in one sector might hamper progress in other sectors, companies might also pressure each other to transform faster and thus accelerate progress towards net zero.

4.2.5. Financing

Financing per se (raising capital, access to liquidity) is generally not seen as a significant challenge for listed and large companies⁵⁵. Their access to the capital market makes it easier for them to raise capital from private investors through the issuance of bonds or through capital increases. According to diverse sustainable finance regulations, they are required to systematically collect and disclose non-financial information, which facilitates their application of

⁵⁵ The reservation has to be made that the examples in this report constitute in general companies with above-average climate performance compared to other companies in their sectors, which might also facilitate their access to capital.

Sustainability Linked Loans (SLL) for instance. Further, according to industry experts, many investments into the transition are still made with companies' own funds from their free cash flow and with regular corporate loans, just like any other "regular" investments.

Large institutional investors including banks claim to have an intrinsic interest that their investments become more sustainable. Consequently, they might be inclined to finance the transition of their investee companies, which might also go hand in hand with engagement activities. For SME, however, it is fair to assume that the financing challenge is substantially bigger (Box 9). Even though the "greenium", i.e., the yield markdown for the investor, of sustainability-linked loans and bonds can considerably lower the cost of capital for the issuers of debt instruments (Kölber & Lambillon, 2022), as e.g., experienced by Holcim (see Box 6), the effect is expected to be much smaller for SME. This is because the efforts necessary to meet the requirements for sustainability-linked financial instruments are only partially scalable and are proportionally smaller, the higher the issued sum.

4.2.6. Inconsistent regulatory environment

Like in the case of financial institutions, immediate action by real economy companies can be inhibited by uncertain future regulatory frameworks (see chapter 3.4.2). In fact, the expectancy of stricter environmental regulations is one of the main reasons why companies are seeking to improve their climate performance (Deloitte, 2022). At the same time, environmental regulations are not fleshed out sufficiently to incentivise an accelerated transition towards net zero. Additionally, international legislation is highly inconsistent across borders. The resulting gaps, loopholes and inconsistencies make it difficult for companies, especially global ones, to streamline their efforts towards what will be necessary in terms of environmental and climate regulation in the future, as well as their transition related goals.

Box 9: Small and medium-sized enterprises (SME)

Many challenges that companies – and by extension financial institutions – face in the context of financing the transition are particularly pronounced in the case of SME, which are particularly relevant in the Swiss context.

From the industry side, experts have voiced concerns that, for varying reasons, SME might face higher hurdles in making the necessary investments. For instance, SME qualify less easily for transition-related financial products than listed companies. Limited access to financial markets and stock exchanges might aggravate their financing situation further.

What is more, sustainable finance regulation - particularly in the EU, but also in Switzerland -

is generally targeted at large and listed companies and is often oblivious of the specific reality of SME.

Financial institutions have equally mentioned SME as one of the challenges in transition finance (five of ten interlocutors). Some of them declared that transition-related financial products are not well suited for the SME sector. This is because they are only applicable in public markets or require significant efforts to comply, which outweighs the potential benefits when required investments are comparatively small.

For both purpose-driven and use-of-proceeds financial products (see chapter 2.3), the availability of non-financial information such as ESG ratings or emission data on investee companies or projects is key. However, quality and quantity of information on companies that are not publicly traded and particularly on SME is generally much lower than for listed companies. For SME⁵⁶ it is often not profitable to collect, compile and disclose the necessary data and figures to become eligible for transition-related financial products.

As a result, SME are often excluded from transition-related financial products.

⁵⁶ According to the definition of the Swiss Federal Statistical Office (FSO) this includes all companies with less than 250 full time equivalents.

5. Conclusions and outlook

5.1. Understanding transition finance

Most definitions of transition finance have a common starting point, namely financing the transition towards a sustainable economy. While the details of what a sustainable economy means vary across definitions, they all include the reduction of GHG emissions to some degree as a key component of the transition. In this report, we focus exclusively on the climate transition, i.e., the transition to a net zero economy.

Most of the financial institutions as well as industry representatives interviewed would appreciate more clarity and transparency through consistent standards, which are currently lacking. For example, there is presently no common understanding of the distinction between transition finance and green finance. Furthermore, there is a wide variety of financial instruments used to finance the transition of companies or specific activities. Usually, these include standard corporate loans.

Irrespective of the financial instrument, **the credibility of the endeavour a company displays in its transition to net zero should be a key determinant in assessing its eligibility for transition finance.** Therefore, to qualify for transition finance, companies and their respective transition plans should in essence...

- ...be aligned with a 1.5°C climate scenario,
- ...cover the entire value chain,
- ...rely only minimally on NET & CCS,
- ...contain net zero commitments and verifiable key performance indicators,
- ...be approved and overseen by board and top management and integrated within the overall business strategy of the organization,
- ...have actionable, verified science-based near-term and long-term targets,
- ...list time-bound actions to decarbonize and reach the set targets,
- ...be monitored, controlled and reported on,
- ...be revisited as new activities and scientific evidence emerge.

5.2. Current challenges with regard to transition finance

Substantial investment volumes are expected to be needed to finance the transition, particularly in the energy and the harder-to-abate sectors. However, the level of additional investment needs compared to business-as-usual scenarios strongly depends on the respective sector and the regional setting. In Switzerland, estimates lie in the range of several CHF billions per year to finance the transition with regards to domestic GHG emissions. Mobilising this additional volume of investments is not considered to be a major challenge – at least for the

major single emitters with good access to the capital market. The money is generally available, yet it is not necessarily spent on the transition to net zero.

A key challenge is that many of the necessary investments are not economically viable yet or are attached to financial risks that do not meet investors' return expectations. Especially the longer timescale and the perceived risks of transition investments may prevent financial institutions from financing transitioning companies.

From the perspective of the real economy, besides risk considerations, technological challenges, competitiveness concerns and the dependency on other sectors remain main challenges. From both the financial and the real economy, SME were identified to face particularly large challenges in terms of transitioning efforts and accessing finance.

5.3. What is needed?

The actions of companies in the real economy and of financial institutions are principally guided by two premises: They need to be profitable and they must comply with the law. That being said, companies would generally not take action far beyond regulatory requirements if such action did not lead to improved competitiveness and consequently result in enhanced profits in its own right.

5.3.1. Standards and definitions

As shown in chapter 2.2, widely adopted and consistent definitions of transition finance or even what the transition itself means are presently lacking. This fact was mentioned as a problem from both financial institutions and the real economy and considerably hampers coordinating the efforts of all actors involved.

Therefore, more work is needed to develop and promulgate consistent and internationally agreed standards and definitions of transition finance as well as to come up with robust criteria for credible transition plans. Such standardisation work could be undertaken by industry bodies, government agencies or a combination of both.

Additionally, common definitions and – ideally – international standards will be necessary to improve and refine the measuring of the financial sector's impact on the transition. The EU Taxonomy is a notable step in this direction whose practical relevance is however still limited, at least in Switzerland.

Various market-led initiatives such as the Partnership for Carbon Accounting Financials (PCAF), the Task Force on Climate related Financial Disclosures (TCFD) or the Science Based Targets Initiative (SBTi) have successfully championed the adoption of common climate and transition related standards and metrics and continue to be important drivers for innovation and standard-setting in this regard.

5.3.2. Financial instruments

Specific transition finance instruments should serve two purposes: For listed companies, they should ensure that the needed investments are made into the transition rather than diverting funds for other purposes. Credible transition plans can help determine the eligibility for use-of-proceeds instruments such as transition bonds as well as general-purpose instruments such as sustainability-linked loans or bonds.

For smaller companies, transition finance instruments could facilitate their access to the capital market. This could be coupled to the provision of specific expertise that smaller companies typically lack, potentially in partnership with specialized third parties. Such models already exist, as evidenced by several Swiss banks offering transition loans to SME that include additional sustainability-related capacity building services for the borrowers.

5.3.3. Regulatory measures

The two main regulatory levers to overcome the largest economic challenges with regard to the transition, in particular in the harder-to-abate sectors, are: 1) incentives to improve the profitability of decarbonised products, which would improve the risk-return profile of transition financing by banks and the profitability of transition related products and services for real economy companies; 2) regulations introducing prohibitions of or limitations to high-emitting business activities, which would lower the profitability and risk-return profile of related activities.

A key incentive, which was cited both by financial institutions and the real economy experts, **would be the introduction of an adequate CO₂ pricing system**. Such a regulation would incentivise low-carbon products over their high-carbon alternatives. Because unilateral national action could considerably lower competitiveness of domestic companies, an internationally coordinated CO₂ pricing providing a level-playing field would be highly beneficial. Past negotiations on climate mitigation measures have however shown that international agreement on such regulations is enormously difficult to achieve.

Disclosure regulations regarding the climate impact of companies (e.g., carbon footprints, intensities or climate alignment metrics) can help investors to make informed investment decisions and align their capital flows with climate goals. For such investment decisions to have an impact on secondary markets, however, requires that a critical mass of investors is interested in aligning their investments with climate goals. Also, equity investments into more sustainable companies at best only indirectly lead to an increase in transition related efforts by the investee companies (Kölbel et al., 2019). Further, disclosure regulations mainly affect large and listed companies (to date) and are thus of limited relevance for transition finance of SME or real estate companies.

Hard limitations and prohibitions (e.g., the banning of fossil fuel driven cars), while potentially effective and efficient from an environmental perspective, are not seen favourable from an economic point of view and generally lack acceptance among most economic actors. Given the urgency of climate mitigation, such limitations or prohibitions might however be needed if softer policy instruments fail to achieve global climate goals.

All regulatory measures are to some degree dependent on international consistency and agreement. This is pivotal because firstly, unilateral national action alone would work against the competitiveness of domestic companies and secondly, global responses are needed to make the transition towards net zero happen.

5.4. Outlook

In general, the understanding and definition of transition finance needs to be sharpened and applied consistently among sectors and across geographies. Additionally, more research and collaboration is needed to find innovative ways to overcome the challenges attached to the transition, as presented in chapters 3.4 and 4.2.

When asked about which actors are needed to manage the current challenges in terms of financial risks and profitability, most interviewees and the industry representatives stated that **the buy-in from several actors would be needed**. All these actors (transitioning companies, governmental bodies, financial institutions, investors and civil society) will have to find ways to account for the current risks of transition finance and incentives to overcome them.

Moreover, regulations will likely be needed to incentivise increased investments into the transition, by accounting for both financial institutions and real economy companies. The most effective and efficient tool for this would generally be a global carbon price and/or comprehensive emission trading system. This is supported by nearly all financial institutions questioned and the industry experts. Furthermore, transparency and disclosure obligations might provide indirect levers to increase pressure on affected reporting entities and improve decision-making by investors.

There are considerable challenges that were not investigated in detail in this report but might be important to consider in the context of financing the transition in future research. For instance, **the transport and real estate sector**, which form the two largest drivers of emissions in Switzerland. Here the landscape is dominated by a huge variety of actors and specifically also private households, rather than a few high emitting corporations. Another example are **SME companies**, which face partially more pronounced challenges than large and listed companies (see Box 9). The broad mass of mature SME companies, as well as start-ups and innovative business models might both play key roles in the transition and should also be investigated in more detail.

6. Recommendations by WWF

As the previous chapters have illustrated, the concept of transition finance and its significance in building a net zero economy is fraught with complexities and challenges. At the same time the transition finance space is evolving quickly and likely to witness a lot of innovation in the coming years. More research and collaboration will be needed to capture these developments and deepen the findings presented in this report. Additionally, it will be important to collect practical experiences regarding transition finance with a view to seeking out and highlighting best practices in the market and to promoting mutual learning.

Notwithstanding these reservations, it appears highly pertinent to end this report with a few practical recommendations drawn from the extensive empirical and theoretical evidence underpinning it. Grouped by target audience, namely the Swiss financial sector, the Swiss industry and Swiss policymakers, the recommendations listed below are interconnected in multiple ways and partly overlap. Hence, an integral perspective is warranted when interpreting them. Finally, it should be noted that the recommendations are formulated by WWF who commissioned the present study and not by the lead authors themselves.

Box 10: Recommendations to the Swiss financial industry

- Adopt a clear and uniform understanding of transition finance, including specific reference to how this definition relates to green finance, and determine the eligibility criteria for transition finance by considering both the activity to be financed and the company seeking finance (credible transition plan).
- Assess which of your financial products and services align with your in-house definition of transition finance and offer specific products and services to accelerate the transition to an environmentally sustainable economy, with a particular focus on SME (e.g., sustainability linked bonds or credits, blended financial products, supporting services to companies in transition).
- Set up a detailed, verifiable, and actionable transition plan that is aligned with your science-based net zero target, including short- and mid-term targets.
- Understand, measure, and disclose the impacts of the transition finance you provide and engage with your clients to identify areas where transition finance is needed most.
- Engage with your clients to make them implement and disclose robust and time-bound transition plans. Support SME in capacity building related to their climate strategy and disclosure.

- Build in-house capacities on transition finance and make transition finance a top priority for senior management.
- Advocate for conducive policy and framework conditions that enable an orderly transition toward an environmentally sustainable economy.

Box 11: Recommendations to the Swiss industry

- Set and implement a science-based net zero target for your emissions, covering the entire value chain (including Scope 1, 2 and 3 GHG emissions), through joining the Science Based Target initiative (SBTi).
- Develop and disclose a detailed, verifiable, and actionable transition plan that is aligned with your net zero target, based on your assessment of how reliant your business is on carbon intensive activities and assets.
- Align your investment plans (capex and opex) with your short- and long-term net zero targets.
- Refrain from using Carbon Capture and Storage (CCS) and negative emission technologies (NET) in your decarbonization trajectory as much as possible.
- Identify and pull all available levers for action within and outside of your company to achieve net zero emissions while maximizing resource efficiency and generating broader positive impact for the environment (e.g., advocate for conducive policy and framework conditions).
- Foster technological innovation and cooperate with businesses across sectors and academia to accelerate progress toward net zero.

Box 12: Recommendations to Swiss policymakers

- Enshrine Switzerland's net zero target in law and elaborate detailed quantified decarbonization pathways for the financial sector and harder-to-abate industries, in collaboration with the industry.
- Promote the adoption of a clear and common definition of transition finance, in collaboration with the financial sector and the industry.
- Develop effective, consistent minimum quality standards and cutting-edge metrics for credible transition plans, aligned with international developments and best practice.

- Make disclosure of net zero aligned transition plans mandatory for financial institutions and corporates and produce practical guidance and tools to support them.
- Drive the disclosure of standardized non-financial information from companies, particularly SME, through effective regulation.
- Set up a mechanism to analyse regular progress made by the industry and the financial sector with regard to Switzerland's net zero target.
- Create incentives for financing the transition to net zero, by de-risking investments in financially not (yet) viable activities or technologies (e.g., through a Swiss green investment bank) and by improving the risk profile of low-carbon alternatives, for instance through comprehensive carbon pricing.
- Foster the development and application of technological solutions to reduce GHG emissions in harder-to-abate industries.

Annex

A1. Interview partners

List of financial institutions participating in the structured interviews

- Marc Hänni, Vontobel
- Romina Schwarz, Zürcher Kantonalbank
- Daniel Wild, Credit Suisse
- Robert Ramer & Michael Keller, UBS
- Thomas Schmid & Dominik Meyer, Fontavis
- Ralf Seiz, Finreon
- Michael Diaz, Alternative Bank Schweiz
- Matthias Schneeberger, Berner Kantonalbank
- Andreas Holzer, Basellandschaftliche Kantonalbank
- Fabienne Fricker, Raiffeisen Schweiz

List of external experts providing insight into the real economy

- Armin Eberle, Head of the Institute of Sustainable Development, ZHAW School of Engineering, and former Head of the Energy Agency for the Swiss private sector (EnAW).
- Beat Affolter, Head Center Corporate Performance and Sustainable Financing, ZHAW School of Management and Law
- Daniel Kalt, Chief Economist and Chief Investment Officer & Michael Keller, Head Multinationals, UBS
- Michael Matthes, Head of Environment, Safety and Technology & Linda Kren, Environment and Responsible Care, scienceindustries

A2. Examples of definitions of transition finance

Environmental Finance (2019) and CBI (2020) suggest a way of distinguishing between what they consider as green finance and transition finance respectively with respect to sectors, companies or activities. According to Environmental Finance (2019), transition finance has its relevance only in harder-to-abate sectors that cannot become green in the near future but can and need to get greener or less brown faster.

In their white paper, CBI (2020) similarly propose labels to differentiate between green and transition in the following way:

- Green label for investments in activities or companies which are relevant in the long term and are either close to or already aligned with net zero goals.
- Transition label for investments that either contribute substantially to net zero goals but will be phased out eventually or continue to be relevant in the long term, but the long-term alignment to net zero goals is still uncertain, i.e., for harder-to-abate sectors.

The EU takes a different approach at the level of activities. The EU taxonomy defines transitional activities as those that are currently not close to net zero emissions but contribute to a transition to net zero. Furthermore, to be deemed compliant with the EU taxonomy, transitional activities must have the best performance in the sector or industry without locking-in carbon-intensive assets or processes and without having a technologically or economically feasible low-carbon alternative (EU TEG 2020). In this sense, financing these transitional activities cannot make a brown company green. It can only make a brown company “less brown”. However, this narrow definition does not do justice to the complex process of transitioning very different sectors and industries. Therefore, among other things, a potential extension of the EU taxonomy framework to support economic transition is currently being elaborated (European Commission, 2021b).

A3. Details on financial instruments

A3.1. Financial instruments in the literature

As outlined in chapter 2.2, the definitions of transition finance have different scopes. Depending on the definition, the financial instruments that may be used to implement them vary accordingly. Broadly, the literature differentiates between use-of-proceeds instruments and fixed-term general-purpose instruments (e.g., ICMA 2020a, OECD 2021, Japan 2021) in the context of transition finance.

Use-of-proceeds instruments: green bonds or transition bonds

With use-of-proceeds instruments such as green or transition bonds, financing is linked to a specific purpose, e.g., a climate project. Use-of-proceeds instruments are incentivised by **issuer premiums or a yield discount at issuance** (OECD 2021): Bonds are typically priced at a premium to other corporate papers by the same issuer, i.e., investors price bonds higher than they would price other issuances by the same issuer and accept lower yields if the use of proceeds is specified to be a green or transition activity.

Depending on which definition of transition finance is used, some green bonds could be considered transition finance instruments. The Green Bond Principles (GBP) from ICMA have been established in 2017 and updated several times (ICMA 2021). They are based on four components:

1. Use of Proceeds,
2. Process for Project Evaluation and Selection,
3. Management of Proceeds, and
4. Reporting.

Furthermore, the EU has developed the EU Green Bond Standard (EU TEG 2019a). Based on the Green Bond Principles (GBP; ICMA 2021) and aligned with the EU Green Bond Standard (EU TEG 2019a), CBI has developed the Climate Bond Standard and Certification (CBI 2021). A recent report on debt capital markets illustrates a substantial shift toward green and sustainable labelled bonds during the last five years, although starting from a low level (WWF 2021). In some countries the share of labelled bonds has increased from nothing to 20 % of all bonds during this time; globally this share is estimated at around 10 %. However, with regards to the total financing volume, this is still a minor part. In the energy sector, project financing in general only makes up 10 % (IEA 2019). This means that, globally, labelled bonds are responsible for less than 1 % of the total financing volume.

To differentiate between green and transition, there have been efforts to define transition bonds, equivalent to green bonds or social bonds, though no common standard has yet been agreed upon (CBI 2020, AXA IM 2019). This lack of a common definition and the competition between transition bonds and other already established green bond categories partially explain why the market uptake of this new asset class has so far been moderate (Environmental Finance 2021). The EU has also recognised this problem. The current EU Strategy for Financing the Transition to a Sustainable Economy includes an extension of the framework of sustainable finance standards and labels (European Commission 2021). Part of this strategy is to work on labels for transition bonds or sustainability-link bonds (see below).

Use-of-proceeds instruments have also been criticised. Specifically financing green projects could free up capital for the company to use on different, potentially harmful purposes (Levine 2021). For this reason, critics might prefer general-purpose financing, such as KPI-linked loans and bonds as outlined below.

Fixed-term general-purpose instruments: KPI-linked loans and bonds, most commonly sustainability-linked loans and bonds (SLL and SLB)

This type of instrument is still new, but it has great potential for positive change (WWF 2021). Unlike use-of-proceeds instruments, the fixed-term general-purpose instruments are, as the name suggests, not tied to a specific purpose or project. Rather, the financing is tied to general company-wide KPI, e.g., total GHG emissions. In this category, SLL and SLB are most commonly associated with transition finance. They use **penalty mechanisms** in the event of non-compliance with pre-defined company-level goals. For example, the interest rate on the SLL increases if targets are missed. SLB have been shown to incentivise sustainability improvements as long as the potential penalty is higher than the savings through issuer premiums (Kölbel & Lambillion 2022). Three types of penalty mechanisms are observed in SLB (OECD 2021):

- coupon step-up,
- premium payment upon maturity, and
- obligation to purchase offsets.

As of 2021, sustainability-linked bond principles (SLBP) as well as sustainability-linked loan principles have been developed based on five core components (ICMA 2020b; LMA, APLMA & LSTA 2021):

- Selection of Key Performance Indicators (KPIs),
- Calibration of Sustainability Performance Targets (SPTs),
- Loan/Bond characteristics,
- Reporting, and Verification.

As mentioned above, the EU Strategy for Financing the Transition to a Sustainable Economy also considers working on labels for sustainability-linked bonds (European Commission 2021).

Further instruments

In addition to use-of-proceeds and fixed-term general-purpose instruments, CBI (2020) identifies open-ended entity-level finance (e.g., equity investments) as long as the entity follows a transition pathway in line with specific principles.

The broader definition of transition finance, the more financial instruments potentially fit to it. For example, Caldecott (2020) purposely defines transition finance broadly enough to allow for further financial services such as engagement activities to be considered as part of transition finance. Next to use-of-proceeds instruments and SLL/SLB, these include (as outlined in NATIXIS 2020):

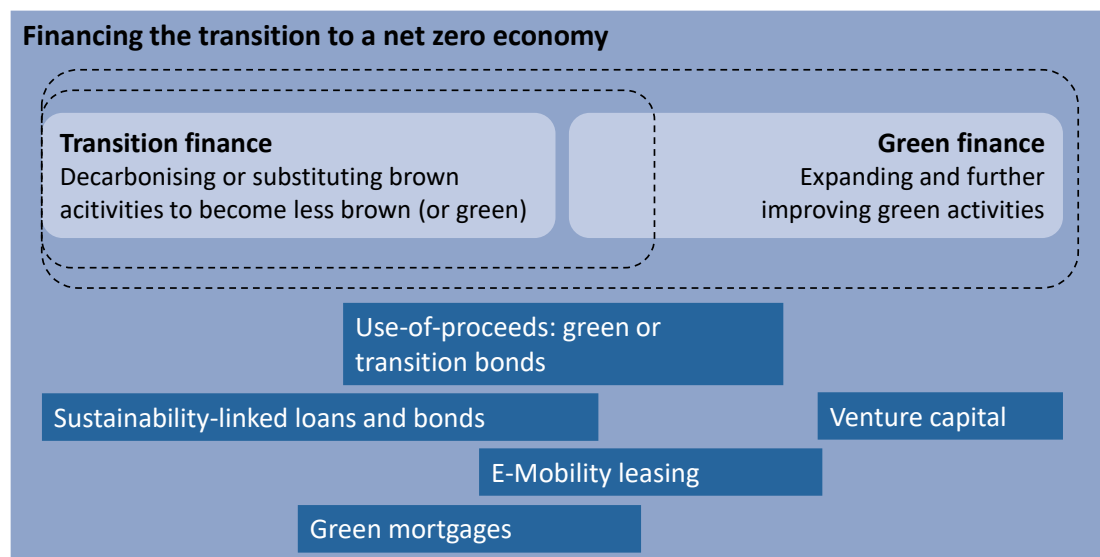
- Negative screening/exclusion and/or divestment,
- ESG integration or best-in-class investing, as well as
- Active ownership (engagement and voting).

A3.2. Instruments according to Swiss financial institutions

As mentioned in section 2.2.2, Swiss financial institutions often only have a vague definition of transition finance. Consequently, a wide range of financial instruments may qualify as transition finance:

- Sustainability-linked bonds and loans,
- Green bonds and loans,
- Microcredits or venture capital for green activities or companies,
- Equity investments for companies meeting predefined transition criteria,
- Funds: assets with specified pathway to GHG-reduction, engagement funds, private equity funds, funds with shorting, funds with exclusions,
- E-Mobility leasing: better leasing conditions, e.g., for electromobility or dependent on emission standards for lorries.
- Instruments in the real estate sector:
 - Credits with a lower interest rate for when Minergie-Standard is met,
 - Green mortgages for new buildings or renovations where certain climate-related conditions are met, or
 - Support of specific activities via sustainability bonds.

Figure 9: Potential financial instruments depend on the definition of transition finance



Financial instruments may or may not be considered transition finance depending on the definition of transition finance. The placement reflects whether an instrument is more commonly used in the context of transition finance or green finance. The instruments included are used as illustrative examples and do not represent an exhaustive list of possible financial instruments.

Figure INFRAS.

Several of the approached Swiss financial institutions do not (yet) offer specific instruments with transition finance characteristics. Some of them consider transition finance more as a general concept or framework rather than as specific financial instruments or products. These financial institutions use standard financial instruments which may or may not be different from standard financing based on their specific use case (e.g., financing of renewable energy or general-purpose financing for companies with credible transition plans⁵⁷). Only two out of the 10 institutions offer typical transition finance instruments such as SLB/SLL and green bonds. This is not surprising. SLL and SLB are still new and, as established above, labelled bonds make less than 1 % of the global financing volume.

However, Swiss financial institutions take also other measures to accelerate the transition to a more sustainable economy. All save one perform some sort of engagement with borrowing or investee companies though the details were not part of the interviews. Four of them also explicitly exercise their voting rights. Of those, three can be considered material shareholders for a number of Swiss companies, in some cases to the extent that they have claims towards a representative on the board of directors. Three of them also offer support and advice to their clients, usually related to sustainability in general or sustainability-related topics but not

⁵⁷ There is no consensus at the international level which criteria have to be fulfilled for a transition plan to be considered credible (see chapter 2.4).

specifically related to transition finance. For example, some clients ask advice on the importance and details of ESG-related KPI or effective measures to improve sustainability. Two financial institutions connect their clients with organisations such as NGO or universities who are knowledgeable in the topic of interest. The third financial institution is involved in educating clients in sustainability management.

Target sectors and companies

Most of the questioned financial institutions generally work with all sectors, especially those with no specific transition finance instruments. Four of them, however, place a particular focus on climate-relevant sectors, one of the respondents specifically on renewable energy. Also, for four institutions, at least a small focus lies with the housing sector.

The target companies for most interviewed financial institutions are small and medium-sized enterprises (SME) and they therefore have only few big companies amongst their customer base, though two have a specific focus on listed companies of all sizes and two on large companies.

A3.3. Assessment of transition finance instruments

The instruments described above have different use cases but also face different challenges. Moreover, they have different modes of action. Table 2 below summarizes those aspects in the most relevant financial instruments⁵⁸:

⁵⁸ The financial instruments and measures outlined below may qualify as transition finance depending on the definition applied and the specific strategy applied. The assessment is based on this assumption.

Table 2: Assessment

Financial instruments and measures	Use case	Challenges*)	Advantages	Mode of action
Use-of-proceeds instruments (assessment similar for E-Mobility leasing, Green mortgages)	Financing tied to purpose	<ul style="list-style-type: none"> ▪ Hard to control that emissions are not just shifted elsewhere (overshoot within company). ▪ Requires assessment of purpose. 	Easy to control if conditions are correctly applied.	Direct impact on specific purpose.
Fixed-term general-purpose instruments such as KPI-linked loans and bonds	Financial repercussion if targets are not achieved	<ul style="list-style-type: none"> ▪ Unclear which measures or strategies are used to achieve targets (e.g., selling vs. decommissioning production sites). ▪ This makes it hard to assess whether net emissions have been reduced for the sector or just shifted (overshoot within sector). ▪ Requires detailed disclosure for KPI. 	No risk of overshoot within the company.	Indirect impact through incentivising transition for the company.
Investment decisions for listed companies such as negative screening/divestment, ESG integration/best-in-class investing	Selection criteria applied	<ul style="list-style-type: none"> ▪ Small-scale investing or divesting might have little impact. ▪ Success hard to measure. ▪ Requires detailed disclosure of business activities. 	Applicable to all use cases	Indirect impact through market prices.
Active ownership	Engagement and voting	<ul style="list-style-type: none"> ▪ Focus often only on governance issues instead of measures to reduce emissions. ▪ Small-scale active ownership might have little impact 	Applicable to all use cases	Indirect impact through pressure to improve.

*) Additionality is a challenge for all financial instruments and measures. It is generally difficult to assess whether measures are implemented because of the financial instrument or if they would have been implemented anyway. Furthermore, it is debated to which extent large, listed companies even rely on external financing.

Table INFRAS.

A4. Investment estimates for the transition on a European level

For the European Union (EU), there are three main estimates, as shown in Figure 10. Estimates for total annual investments required range from EUR 180 to EUR 562 billion, while the former value of EUR 180 billion by McKinsey (2020) explicitly excludes replacement costs.

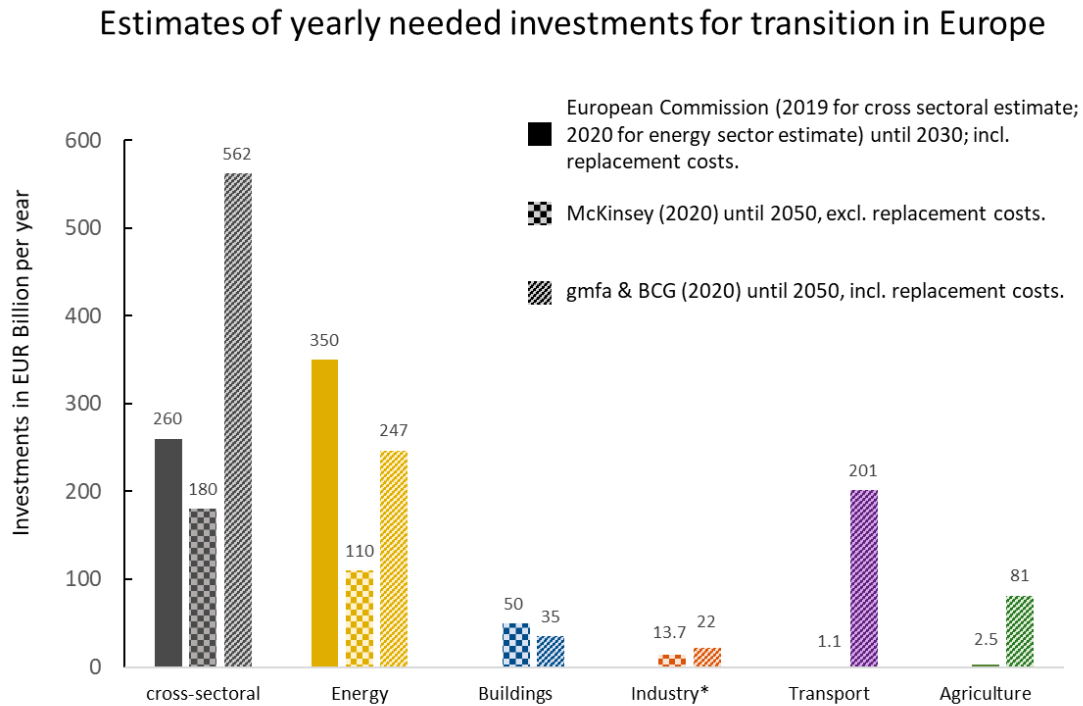
As with global estimates, the energy sector ranks first among all sectors with transition costs of EUR 110 to 350 billion, constituting nearly half of the total investments in the estimate of gmfa & BCG (2020) and nearly two thirds in the estimate of McKinsey (2020).

Particularly the estimates for the transport sector and for agriculture vary widely between the sources, sometimes even by multiple orders of magnitude. This once again highlights the importance of taking account of the different methodological choices made (e.g., excl. replacement costs, considering net investments / returns) when interpreting such estimates.

Gmfa & BCG (2020) suggested investment needs for the transport sector of EUR 201 billion per year for Europe⁵⁹, mainly for the development and production of electric vehicles and batteries, the expansion of electric charging infrastructure, the shift to mass transit and the expansion of hydrogen technology. McKinsey (2020), on the other hand, estimated that only around 19 % of the required investments would be additional, resulting in transition costs for the transport sector of around EUR 1.1 billion. The other 81 % (or around EUR 800 billion per year in total) would come from redirecting investments from climate negative to climate positive assets. In the transport sector, this can easily be explained by the fact that the acquisition of new vehicles requires regular investment, regardless of whether they are powered by fossil fuels or electricity. In this regard, investments needs might even decrease in the future, depending on the price development of fossil fuels and electricity.

⁵⁹ Estimates were converted from USD to EUR using an exchange rate of 0.81407 as per 31.12.2020.

Figure 10: Estimates of investment and finance requirements for the transition in Europe.



Estimates by gmfa & BCG (2020) were converted from USD using an exchange rate of 0.81407 as per 31.12.2020.

Figure INFRAS. Sources: European Commission (2019), European Commission (2020), McKinsey (2020), BCG & GMFA (2020).

The estimates for the total volume of required investments for the transition correspond to around 1.2 % to 3.7 % of EU's GDP⁶⁰, and thus make up a considerably lower fraction of GDP than on a global level. This is likely due to the fact that the EU constitutes highly developed economies with an advanced technological level, comparably resilient infrastructure and a relatively higher share of renewable energy compared to the global economy. Furthermore, investment needs focus on domestic GHG emissions alone, thus emissions from imported goods, which might be highly relevant globally, but do not accrue in the EU itself consequently lower the investment needs inside the EU compared to the rest of the world.

To put the investment needs in context, the estimates shown in Figure 10 make up around 6.1 % to 19 % of the EU's yearly gross investments (GFCF)⁶¹ of close to EUR 3 trillion⁶². As such, total investments needs including transition finance are not expected to be orders of magnitudes higher than total investments actually made in the last years. Considering that the

⁶⁰ The World Bank and OECD estimate a GDP for the EU of USD 15.2 trillion for the year 2020.

⁶¹ Gross fixed capital formation

⁶² According to data from Eurostat: <https://ec.europa.eu/eurostat/databrowser/view/tec00011/default/table?lang=en> [17 September 2021].

average growth rate of gross investments in the EU between 2010 and 2019 was around 3.6 %⁶³, the estimate by McKinsey (2020), which excludes the replacement costs and corresponds to 6.1 % of the EU GFCF for the year 2020, lies in a similar range.

⁶³ Data from Eurostat: <https://ec.europa.eu/eurostat/databrowser/view/tec00011/default/table?lang=en> [17 September 2021]; without the United Kingdom and deliberately excluding the year 2020, as the representativity of this year's (negative) growth rate is estimated to be low due to the Corona pandemic.

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Together, we protect the environment and create a future worth living for generations to come.



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