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FINDIT

Leveraging the Swiss financial sector to finance direct investments in the energy transition

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The authors bear the entire responsibility for the content of this report and for the conclusions drawn therefrom.

Zusammenfassung

Bis heute ist wenig über die Muster realwirtschaftlicher Investitionsströme in Erneuerbare Energien in die Schweiz (Zuflüsse), aus der Schweiz (Abflüsse), die Rolle der Schweiz innerhalb dieser Finanzströme oder die Faktoren, die solche Investitionsentscheidungen prägen bekannt. Das FINDIT-Projekt schliesst diese Lücke. In diesem Projekt erstellen wir eine umfassendste Datenbank zu realwirtschaftlichen Erneuerbare Energie-Investitionen und kombinieren dies mit Investoreninterviews sowie Analysen, wie politische Rahmenbedingungen internationale Investitionsflüsse beeinflussen. Im Arbeitspaket 1 analysieren wir erst internationaler Erneuerbare Energie-Investitionsströme über 48 Länder hinweg, um allgemeine Investitionsmuster zu identifizieren. Die Ergebnisse zeigen, dass internationales Kapital in vielen Ländern eine wichtige Rolle spielt, wenngleich das Ausmass stark variiert. Die Schweiz sticht trotz kleiner absoluter Investitionen als eines der sieben Länder mit den höchsten Nettoabflüssen hervor: hohe relative Auslandsinvestitionen bei minimalen Zuflüssen und begrenztem inländischen Ausbau grosser Anlagen. Wir sehen auch, dass ein grosser Teil der Investitionen von Schweizer Versorgungsunternehmen im Ausland erfolgt, was ein ungewöhnlich hoher Grad an Internationalisierung selbst im Vergleich zu OECD-Peers zur Folge hat. Zudem stammt der Grossteil der Schweizer Auslandsinvestitionen aus dem Bereich der Finanzinvestoren, was die starke finanzielle Integration der Schweiz in den globalen Energiemarkt unterstreicht. Diese Investitionen fliessen primär in benachbarte europäische Länder, insbesondere Deutschland, Frankreich und Italien, sowie in nordische Länder und die USA. Im Arbeitspaket 2 untersuchen wir daher die Motivationen und Hürden, welche die Investitionsentscheidungen von Schweizer Versorgungsunternehmen und Finanzinvestoren prägen. Dies analysieren wir sowohl anhand quantitativer Daten als auch qualitativen Inputs aus semi-strukturierten Interviews. Während Finanzinvestoren vor allem ihre Renditeerwartungen erreichen müssen, orientieren sich Versorgungsunternehmen an einer Mischung aus wirtschaftlichen, regulatorischen und gesellschaftlichen Motiven. Beide Investorengruppen stossen jedoch auf die Gleichen Hürden für Investitionen in der Schweiz, darunter komplexe Genehmigungsverfahren, begrenzte Flächenverfügbarkeit und kleine Projektgrössen. Daher suchen viele Akteure Chancen im Ausland, wo die Rahmenbedingungen planbarer und skalierbarer sind. Trotz der Grösse und Stärke des Schweizer Finanzsektors investieren Schweizer Finanzinvestoren im Vergleich zu Investoren ausgewählter Vergleichsländer relativ weniger Kapital in Erneuerbare Energie-Projekte Angesichts der Grösse des Schweizer Finanzsektors. Im Arbeitspaket 3 führen wir schlussendlich Fixed-Effects-Panelregressionen durch, um den Einfluss politischer Rahmenbedingungen auf Erneuerbare Energie-Investitions-Zuflüsse verschiedener Länder zu analysieren. Die Ergebnisse zeigen, dass sowohl die Anzahl als auch die Stringenz von Policies positiv und signifikant mit Auslandsinvestitionen in Erneuerbarer Energie zusammenhängen. Dies bestätigt, dass ein starkes und glaubwürdiges politisches Umfeld eine zentrale Rolle dabei spielt, internationales Kapital anzuwerben.

Résumé

Aujourd'hui, peu d'information existe à propos des flux d'investissements réels dans les énergies renouvelables entrant et sortant de la Suisse, sur le rôle du pays dans ces flux et sur les facteurs qui influencent les décisions des investisseurs. Le projet FINDIT comble cette lacune en réunissant la base de données la plus complète sur les actifs énergétiques réels avec des entretiens menés auprès d'investisseurs et une analyse de l'impact des politiques sur les flux d'investissements internationaux. Dans le cadre du Lot de Travail 1 (Work Package 1) nous réalisons une analyse macroéconomique des flux d'investissements internationaux dans les énergies renouvelables sur 48 pays afin d'identifier les tendances générales. Les résultats montrent que le capital international joue un rôle important dans de nombreux pays, bien que son ampleur varie fortement. La Suisse se distingue, malgré sa petite taille, comme l'un des sept pays présentant les flux nets sortants les plus élevés, avec des sorties relatives importantes, des entrées limitées et un déploiement national restreint. Une grande partie des investissements des entreprises de services publics suisses se fait à l'étranger, ce qui reflète un degré d'internationalisation exceptionnel, même comparé aux autres pays de l'OCDE. Par ailleurs, la majorité des

investissements suisses à l'étranger provient d'investisseurs financiers, ce qui souligne la forte intégration de la Suisse dans le marché mondial des énergies renouvelables. Ces investissements se concentrent principalement sur les pays voisins européens – notamment l'Allemagne, la France et l'Italie – ainsi que sur les pays nordiques et les États-Unis. Le Lot de Travail 2 (Work Package 2) analyse les motivations et les obstacles qui influencent les décisions d'investissement des entreprises de services publics et des investisseurs financiers suisses, à partir de données quantitatives et d'entretiens semi-structurés. Les investisseurs financiers se fondent principalement sur le rendement attendu, tandis que les entreprises de services publics combinent des motivations économiques, réglementaires et sociétales. Les deux types d'acteurs font face à d'importantes barrières à l'investissement en Suisse, notamment des procédures d'autorisation complexes, une disponibilité limitée des terrains et la petite taille des projets. En conséquence, de nombreux investisseurs recherchent des opportunités à l'étranger, où les cadres politiques sont plus prévisibles et permettent des projets de plus grande envergure. Malgré la taille et la sophistication de son secteur financier, la Suisse investit relativement moins de capital dans les énergies renouvelables que les pays comparables. Enfin, le Lot de Travail 3 (Work Package 3) applique des régressions en panel à effets fixes pour évaluer l'impact des cadres politiques sur les flux d'investissements dans les énergies renouvelables. Les résultats montrent que la densité et la rigueur des politiques sont toutes deux positivement et significativement associées aux investissements étrangers dans les énergies renouvelables. Autrement dit, des politiques solides et crédibles jouent un rôle clé pour attirer le capital international.

Summary

Today, little is known about renewable energy (RE) real-economy investment flow patterns into and out of Switzerland, the country's role within these flows, and the factors shaping investor decisions. The FINDIT project addresses this gap by combining the most comprehensive real-energy asset database with investor interviews and analyses of how policies shape international investment flows. In Work Package 1, we conduct a macro-level analysis of international RE investment flows across 48 countries to identify general investment patterns. The results show that international capital plays an important role in many countries, although the extent varies widely. Switzerland, while small in absolute terms, stands out as one of the top seven net-outflow countries, with high relative outflows but minimal inflows and limited domestic deployment. A large share of Swiss utility investments is made abroad – an unusually high degree of internationalization even compared to OECD peers. Moreover, the majority of Swiss RE investments abroad originate from financial investors, underlining Switzerland's strong financial integration within the global energy market. These investments are primarily directed toward neighbouring European countries, particularly Germany, France, and Italy, as well as to the Nordic countries and the United States. Work Package 2 we examine the motivations and barriers shaping investment decisions by Swiss utilities and financial investors through quantitative data and semi-structured interviews. While financial investors are driven primarily by returns, utilities are guided by a mix of economic, regulatory, and societal motives. Both investor types face substantial barriers to investing domestically in Switzerland, including complex permitting procedures, limited land availability, and small project scales. As a result, many seek opportunities abroad where frameworks are more predictable and scalable. However, despite the large size and sophistication of Switzerland's financial sector, Swiss financial investors allocate less capital to renewable energy (relative to the size of the industry) compared to their peers in other countries when investing abroad. Finally, in Work Package 3 we apply fixed-effects panel regressions to assess the impact of policy frameworks on RE investment inflows. The results show that both policy density and policy stringency are positively and significantly associated with foreign RE investment, confirming that strong and credible policy support plays a key role in attracting international capital.

Main findings («Take-Home Messages»)

- **Integrated in the European renewable energy landscape:** Switzerland has one of the highest shares of outgoing international renewable energy investments, primarily directed toward neighbouring countries, highlighting its strong role in the European market despite limited domestic deployment and underscoring the importance of close integration into the European energy system.
- **Domestic barriers redirect capital abroad**: Complex permitting procedures, limited land availability, and small project sizes make utility-scale renewable energy investments challenging. This suggests that improving domestic investment conditions could help attract and retain more private capital. On the positive side: Capital will not be the limiting factor for the Swiss transition.
- **Utilities try to invest domestic despite challenges:** Swiss utilities continue to finance domestic renewable energy projects even when risk/return profiles are challenging, motivated by strategic or societal objectives and mandates. In contrast, financial investors refrain from domestic investments, as they cannot assume the risks, nor achieve the required returns for such risk levels.
- **Swiss financial investors underinvest in renewables relative to sector size**: Although Switzerland has a large and sophisticated financial sector, its financial institutions allocate less capital to renewable energy than peers abroad - revealing untapped potential to mobilize private finance for the energy transition particularly in the form of debt investments by banks.
- **Strong, credible climate policy frameworks attract international renewable energy investment**: International evidence confirms that higher policy ambition significantly increases the inflow of renewable investment, emphasizing the importance of stable, long-term policy signals for countries aiming to attract foreign investments for its energy transition.

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Abbreviations

BNEF	Bloomberg NEF
EE	Energy Efficiency
RE	Renewable Energy
WP	Work package

1 Introduction

1.1 Context and motivation

Transitioning toward a net-zero energy system requires a fundamental redirection of financial flows. Accordingly, the financial system must play an important role in this transition (Steffen & Schmidt, 2021). Financial investments are becoming increasingly sustainable, with year-to-year growth rates of sustainable investments[1] around 30% (Morgenthaler et al., 2021). However, little is known about the asset-level structure of these investments, as most academic analyses of sustainable finance focus on securities, such as stocks and bonds (Friede et al., 2015).

The Federal Council's net-zero target will require up to 2.1 billion CHF annually until 2035 in new renewable energy (RE) and battery storage investments in Switzerland alone (Trutnevyte et al., 2024). Anecdotal evidence suggests that Swiss investments play an important role in developing such real assets, though largely outside of Switzerland. For example, Swiss utilities have invested heavily in RE projects across Europe. Two of the largest Swiss utilities, Axpo and BKW, had invested in an estimated 1.3 GW of wind and solar PV capacity abroad as of 2019 (SRF, 2019). In comparison, their installed capacity in wind turbines and utility-scale PV within Switzerland accounts for only about 5% of their foreign capacity (Axpo, 2022; BKW, 2021). Similarly, Swiss financial investment managers are also active in investing in the energy transition abroad. Yet, there is no structured assessment of these investments in and out of Switzerland by technology or investor type, nor a systematic understanding of the drivers behind such investment decisions – such as where abroad Switzerland invests and why. Consequently, the impact of Swiss investments on the energy transition, both domestically and internationally, remains unclear.

1.2 Project objectives

To address this, the FINDIT project aims to clarify the current role of Swiss investors – including both the financial sector and utilities – in the energy transition, providing a basis for developing future strategies to better leverage Swiss capital domestically and internationally. The project generates novel insights into the investor landscape and potential levers of change across three work packages:

In Work Package 1 (WP1), we provide an overview of domestic and international renewable energy investments in all OECD countries, with a particular focus on Switzerland, enabling comparison of general investment patterns and investor types. Work Package 2 (WP2) conducts a deep dive into the two largest investor types in Switzerland: Utilities and financial investors. By analysing their decision-making processes and investment drivers, particularly regarding domestic versus international investments, we gain a clearer understanding of the role Swiss investors currently play and could play in the energy transition going forward. Finally, Work Package 3 (WP3) examines policy levers, assessing the importance of policy mixes and instruments on renewable energy investments and whether, and how, these policies specifically affect international investments differently from domestic ones.

By tracing existing investment patterns, exploring investors' drivers and barriers (including differences and similarities between investor types), and assessing the relevance of policies for international investments, FINDIT provides a comprehensive picture of how Swiss capital is currently leveraged for the energy transition both within Switzerland and abroad. These insights can support energy and finance policymakers in refining strategies. The project thus specifically addresses the following three research questions:

1. How do international and domestic energy investment patterns of Swiss actors develop by technology and over time?
2. What underlying drivers explain the observed investment patterns?

[1] Any form of financial service integrating environmental, social and governance (ESG) criteria into business or investment decisions

3. How do policies aimed at accelerating the energy transition impact international investments?

2 Approach, method, results and discussion

We employed different research designs and methods across the three work packages. WP1 relied solely on quantitative data analysis and focused on the collection, preparation, and descriptive overview of RE investment data from BNEF for all OECD countries. This data allowed us to generate key insights into domestic and international investment patterns, both for Switzerland and in comparison, with other countries. WP2 involved a deep dive into key investor types relevant for Switzerland. In this work package, descriptive analyses were extended with an examination of the drivers behind observed investment behaviour. Qualitative methods, specifically expert interviews, were used to understand investment drivers and their relative importance for different investor types, namely utilities and financial investors. WP3 employed regression analysis in a confirmatory setup to assess the specific policy relevance for investment in RE, particularly in an international context. In the following sections, we describe the methods and results of each work package in more detail, followed by a discussion integrating findings across all work packages, highlighting insights that may assist Swiss policymakers in better leveraging Swiss capital to support the global energy transition.

2.1 WP1 – Investment patterns

2.1.1 Method[2]

In WP1, we used a quantitative, data-driven approach to create an extensive dataset of RE financing flows and uncover key macro-level investment patterns. Data on asset financing was sourced from BloombergNEF (BNEF), the most comprehensive database available, and spanned three separate datasets: asset finance, project, and organisations. These were merged, with manual checks to ensure consistency and accuracy. A framework was developed to classify investors into utilities, project developers, financial investors, and “other” for those not fitting the other categories.

Although BNEF provides strong coverage of financing deals, some important variables contained missing values, including deal closing dates, investor industry, investment values, and debt shares. Imputation methods were therefore applied. For missing deal closing dates, group averages were calculated using the relationship between announcement and closing dates, differentiated by technology. For missing debt shares and investment values a more advanced approach was required, for which a random forest model was selected after testing multiple methods.

To reflect the uncertainty introduced by these imputations, standard deviations were calculated for debt shares and investment values. These distributions were incorporated into Monte Carlo simulations, enabling the calculation of 95% probability ranges for key output variables.

The resulting dataset was used to analyse RE financing flows in OECD countries between 2004 (the first year of BNEF data availability) and 2022 (the most recent full year available). Technologies covered included onshore wind, offshore wind, solar PV, and biomass & waste, which together accounted for 89% of reported deals. Smaller technologies – such as solar thermal, small hydro, and marine – were aggregated into a “other” category, together with a small share of solar and wind projects not identifiable in detail (3.3% of total investment value).

Deals classified as abandoned, postponed, or in active planning (with no closing date available) were excluded from the analysis. By contrast, all deal types (new build, acquisition, and refinancing) were included, as the focus was on overall capital flows rather than only new developments. Deals without identifiable investors – those reported as “not reported” or “private” – were also excluded, as the origin

[2] A more extensive description of the method developed for this analysis can be found in Eberhart et al. (2025): https://doi.org/10.1016/j.isci.2025.112367

of capital could not be established. These exclusions amounted to 4.4% of equity investment values and 73% of debt investment values in the global dataset. We do not expect these exclusions to meaningfully affect any of our key results, particularly when comparing Switzerland with other countries, as there is no indication that the missing debt data would be disproportionately skewed toward Swiss investors. A potential bias could in principle arise if Swiss investors systematically reported fewer transactions than banks from other countries or were more likely than others to invest anonymously and thus be listed as "private" or "not reported." Yet this scenario appears unlikely, as we find no evidence that Swiss investors tend to be less transparent in deal disclosures than other investors, especially in regulated financial markets and cross-border project finance. A second theoretical concern could be that Swiss banks predominantly engage in transaction types that are less frequently reported in general. However, we also do not find any evidence in the data that certain transaction types have more or less underreporting. We therefore assume that any missingness in the global dataset would affect all countries in a broadly comparable way. Therefore, while the exclusion of unidentifiable debt transactions reduces overall sample size, we do not expect it to alter our conclusions regarding the relative role Swiss investors and particularly banks as key providers of debt play in renewable energy investment.

2.1.2 Results

To describe the investment landscape and Swiss investment patterns, we first conducted high-level macro analyses of aggregated RE flows across all OECD countries, followed by Switzerland-specific analyses to highlight key trends over the past two decades.

2.1.2.1 Global patterns

First, financing flows between countries were aggregated across all years and technologies and visualised using Sankey diagrams (Figure 1). These diagrams highlight the cross-border dynamics of RE investments. It is apparent that international flows play a role for many countries, yet they differ substantially across countries in both the amount of capital flowing out and the investments attracted. Switzerland, unsurprisingly as a small country, is a relatively minor player in terms of absolute investments compared with larger economies such as the US or UK.

While we do include "new build", "acquisition", and "refinancing" deals in our analysis, as our objective is to capture overall capital flows into power plants, new-build transactions represent by far the largest share of the dataset - around 60% of the invested capital (see Figure 2). Accordingly. the findings are predominantly driven by investment flows associated with adding new capacity.

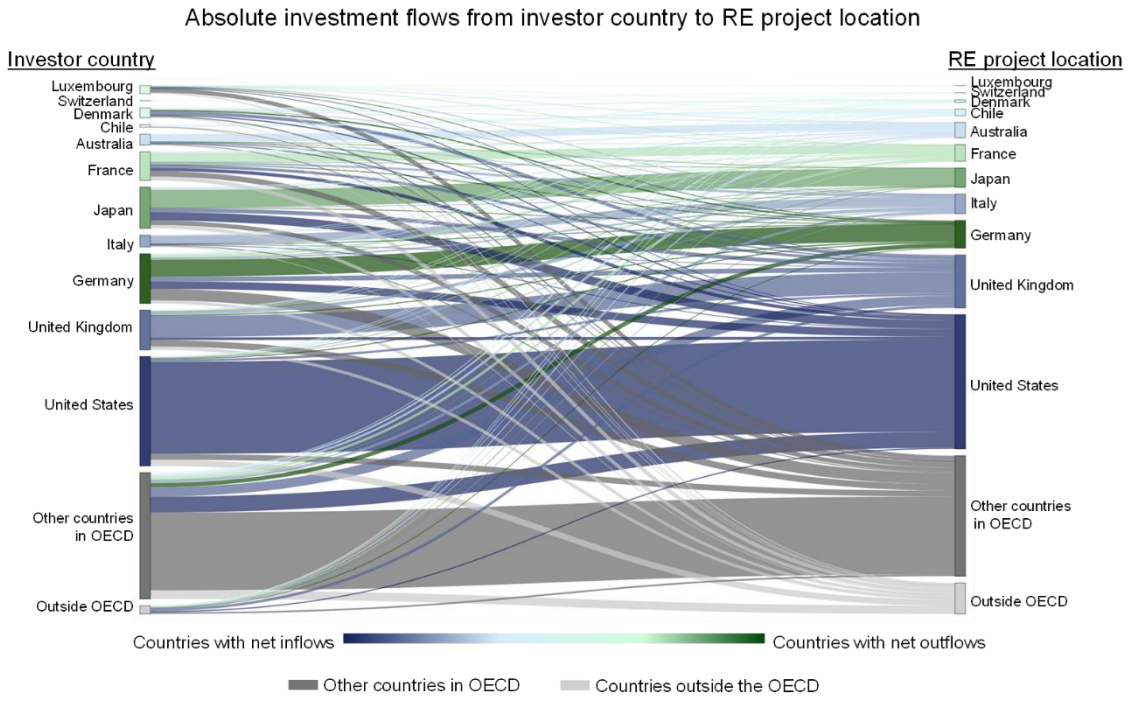


Figure 1: RE investment flow landscape. Flows in $M between investor countries and investment project location countries for largest net in- and outflows countries, plus Switzerland. All data is aggregated across technologies and over time (2004-2022). Shown in 2020 US$. Source: (Eberhart et al., 2025)

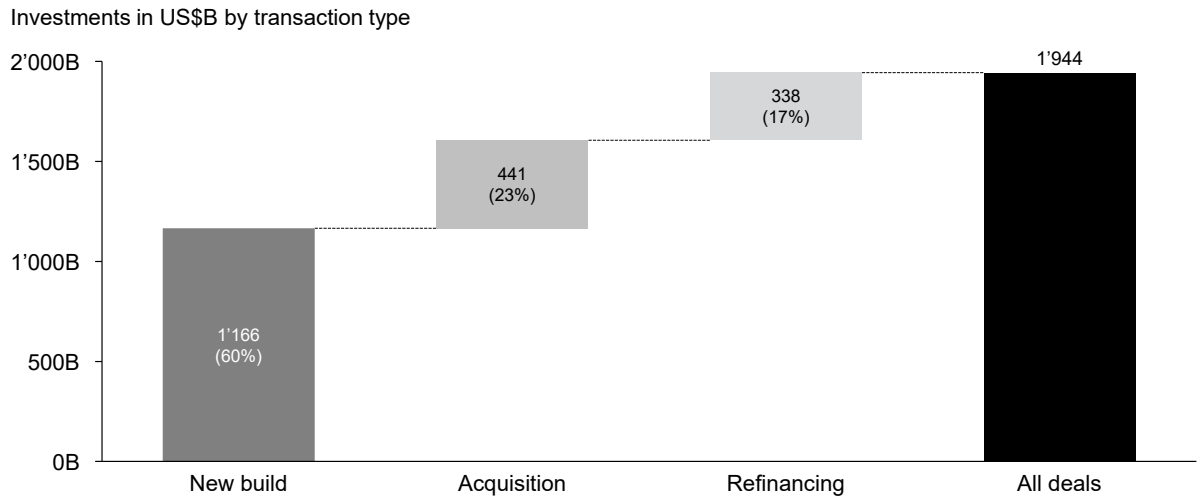


Figure 2: Absolute and relative share of investments in final (imputed) dataset by three reported transaction types: New build, acquisition, and refinancing. Data is considered from 2004 to 2022, includes investments from/to OECD countries and absolute investment numbers are shown in 2020 US$. Source: (Eberhart et al., 2025)

To better understand how countries differ in inflows and outflows, they were ranked by absolute net outflows, with additional insights provided using relative measures that compare inflows and outflows against the size of each country's domestic deployment (Figure 3). In this view, Switzerland already appears among the top seven net-outflow countries, even in absolute terms. Moreover, Switzerland stands out as a notable outlier in relative investment flows, with substantial outflows, minimal inflows, and modest domestic deployment, resulting in exceptionally high relative outflow shares. This indicates

that Switzerland, while small, yet financially robust nation, does contribute to RE international deployment – particularly when measured relative to local deployment.

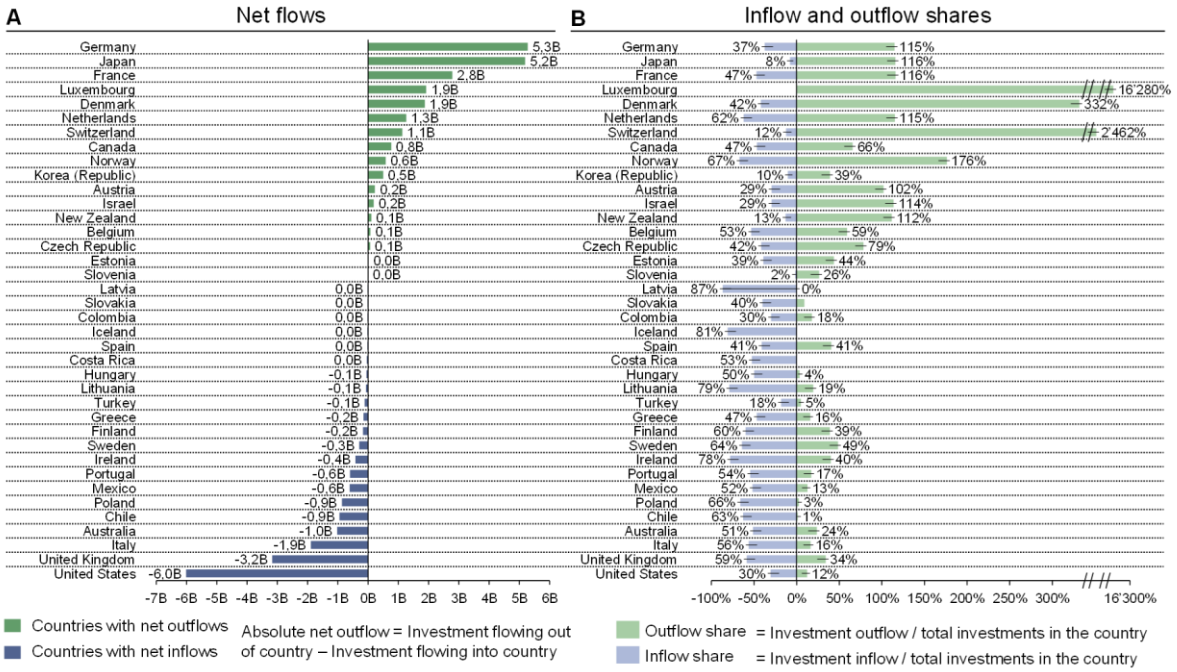


Figure 3: Annual RE investment flows per country 2004-2022. A. Net flows as an average per year over the entire time period (in $). B. Relative flow shares in relation to the total investment sums invested in the respective country. Aggregated across technologies and over time (2004-2022). Shown in 2020 US$. Source: (Eberhart et al., 2025)

Next, to develop insights into potential drivers of these pronounced patterns, investment flows were analysed in more detail by technology and investor type, both aggregated across all OECD countries (Figure 4) and for Switzerland alone (Figure 5).

Across the OECD, utility investors were found to dominate, particularly in wind projects, while financial investors have only increased their presence across technologies over time. These financial investors generally hold higher shares of cross-border outflows, contributing to the rising outflow shares observed across most technologies. Comparing OECD-wide internationalization shares with those of Switzerland reveals the exceptionally high share of international investments by all Swiss investor types, particularly utilities, who are typically more local in other countries. According to BNEF data, 96% of Swiss utility investments were made internationally. Additionally, most Swiss investments abroad originate from financial investors, even when considering only equity investments, who account for nearly 60% of the total. This demonstrates that Switzerland's financial integration into the international RE market is driven not only by its energy sector but also by the active involvement of its financial sector.

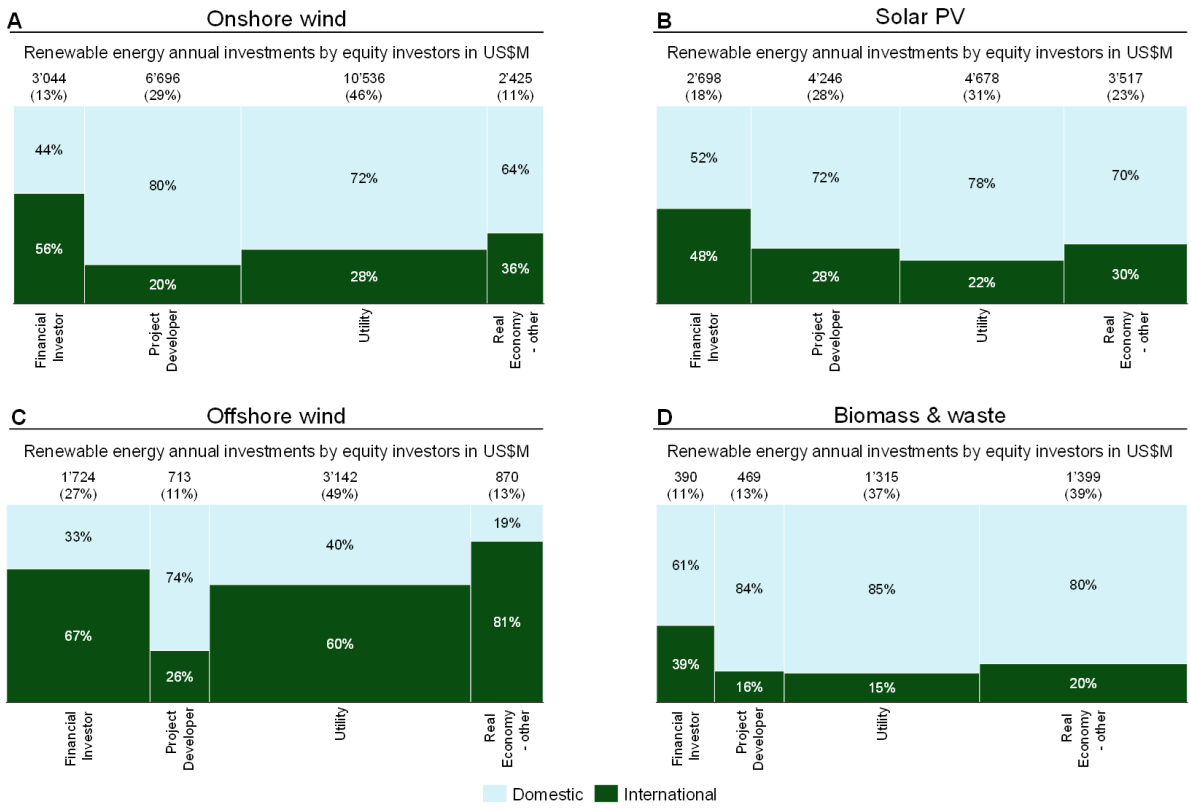


Figure 4: Domestic and international equity investments by investor types. By technologies: A. onshore wind, B. solar PV, C. offshore wind, D. biomass & waste. Data is considered from 2004 to 2022 and absolute investment numbers are shown in 2020 US$. The area of each chart reflects the relative distribution of domestic versus international investments and the relative share invested by type of equity investor. The shares of domestic and international investments per investor type are indicated by the percentage numbers within the areas. The absolute annualized investment amounts and the corresponding relative share of investments per investor type is indicated at the top of each column. Source: (Eberhart et al., 2025)

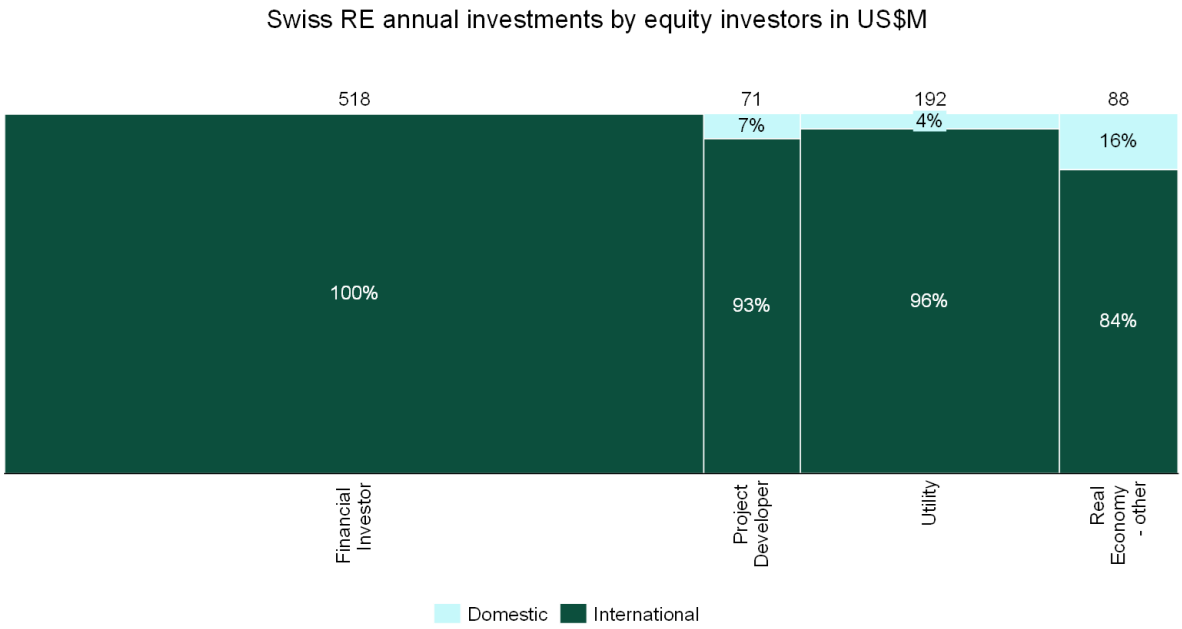


Figure 5: Domestic and international equity investments by investor types for Swiss investors only. Data is aggregated across all RE technologies (onshore and offshore wind, solar photovoltaics (PV), solar thermal, biomass and waste) from 2004 to 2022 and absolute investment numbers are shown in 2020 US$. The area of the chart reflects the relative distribution of domestic versus international investments and the relative share invested by type of investor. The shares of domestic and international investments per investor type are indicated by the percentage numbers within the areas. The absolute annualized investment amounts per investor type is indicated at the top of each column. Note that an additional 187 million US$ are being invested via debt annually but not shown here – this is predominantly by financial investors only.

2.1.2.2 Switzerland focus

Next, we focus specifically on Switzerland as an investor country, examining where investments predominantly flow and which technologies are supported. The analysis shows that Swiss investors are strongly linked to the European RE market, demonstrating that Switzerland's integration in the regional energy landscape extends beyond electricity generation, consumption, and trade. Over half of all Swiss investments in utility-scale RE projects are directed to neighbouring and other European countries.

As illustrated in Figure 6, Germany, France, and Italy – Switzerland's direct neighbours – receive the largest shares of these investments. Among non-neighbouring European countries, Norway and Sweden are key destinations. Outside Europe, the United States stands out, accounting for 76% of all non-European investments. This concentration is largely driven by a major international asset management fund headquartered in Switzerland, which primarily manages U.S. pension funds.

Regarding technology focus, nearly 60% of Swiss investments are allocated to wind, mostly onshore, with the exception of Germany, where offshore wind dominates (see Figure 7). Overall, Swiss financiers appear to prioritise technologies abroad that are not yet widely deployed within Switzerland.

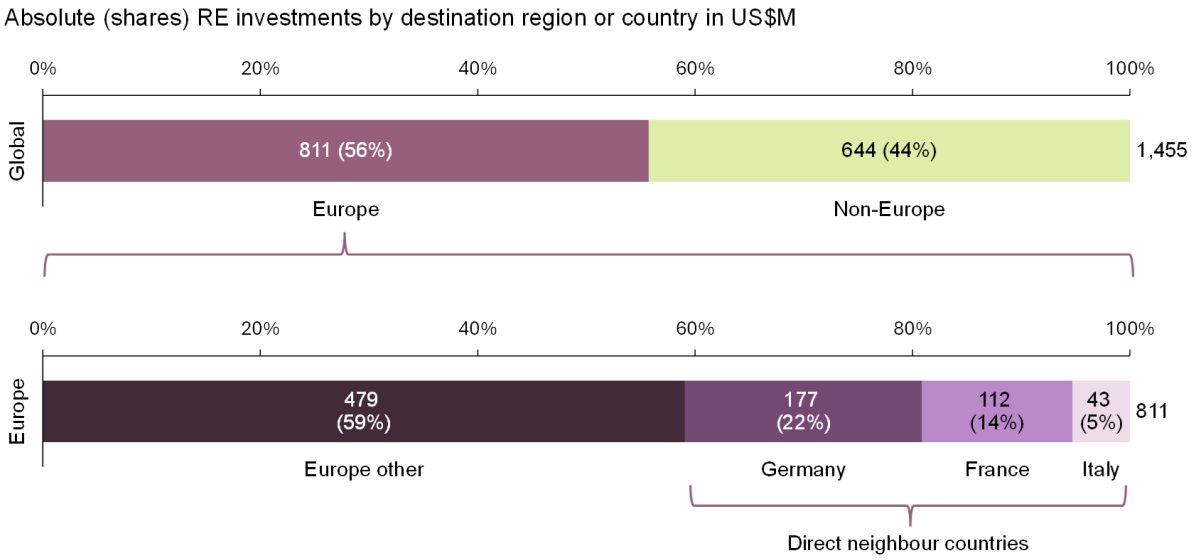


Figure 6: Annual RE investment flows out of Switzerland into different destination countries or regions. Europe vs. Non-Europe. Within Europe: Europe other, direct neighbour countries (Germany, France, Italy. Data is aggregated across all renewable generation technologies (onshore and offshore wind, solar photovoltaics (PV), solar thermal, biomass, small-scale hydroelectric (no large hydro)) from 2013 to 2022 and shown in 2020 US$.

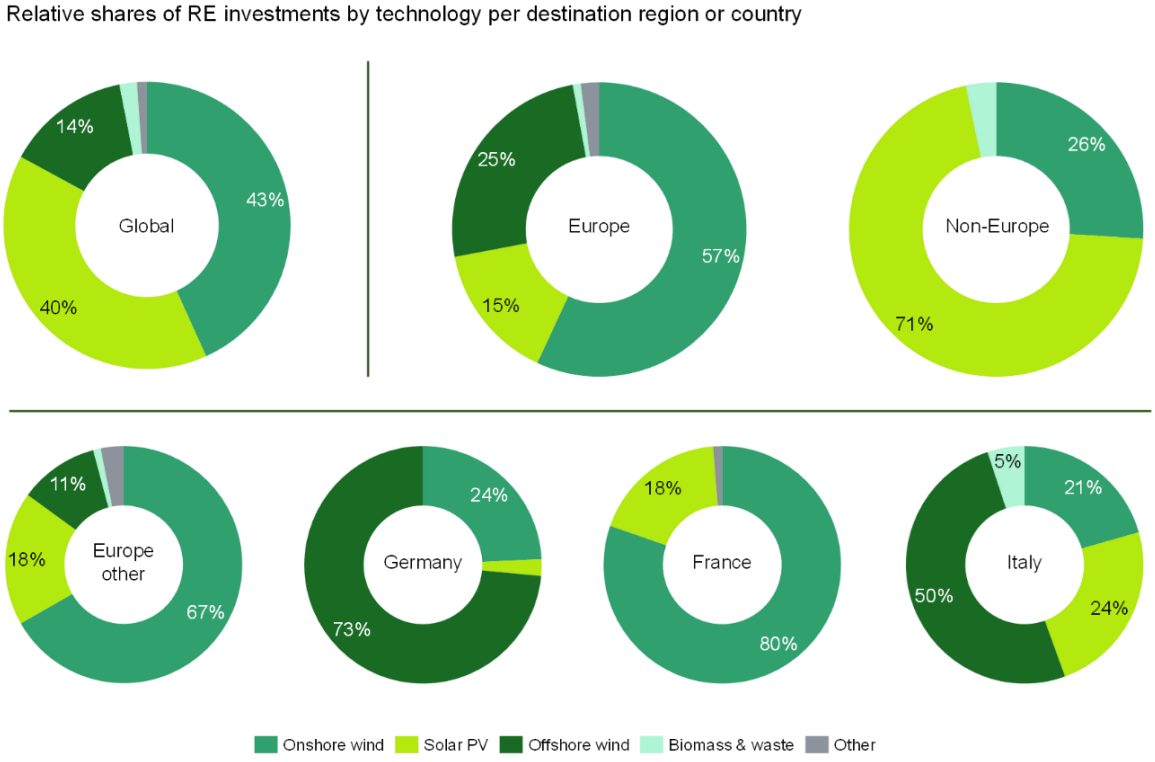


Figure 76: Total and relative annual RE investment flow out of Switzerland globally, Europe vs. Non-Europe and Xountries within Europe (Europe other, Germany, France, Italy) by technology. ”Other” includes small hydro and solar thermal. Data is aggregated for 2013 to 2022, and the total is shown in 2020 US$.

2.2 WP 2 – Investor deep-dive case study

In WP2, we build on the insights from WP1 by conducting dedicated case studies of the two most important investor types for Switzerland: financial investors and utilities. First, we aim to identify the key investors within these groups and understand the rationales behind their strong preference for investing abroad, as well as any notable differences between the two investor types. Second, we examine whether the fact that financial investors account for the largest share of Swiss RE investments (see Figure 5) also means that Swiss financial investors invest more in RE overall than financial investors from other countries, after controlling for the size of each country's financial sector. Third, we conduct a detailed analysis of the energy investments of (state-owned) utilities in Switzerland, examining both quantitative investment patterns and qualitative drivers behind their choice of investment locations.

2.2.1 Method

2.2.1.1 Quantitative analysis

In WP2, we conduct two types of quantitative analyses. The first is based on the BNEF dataset developed in WP1. In addition, we perform a utility-specific analysis to understand how Swiss utilities have invested in energy production projects, both domestically and internationally, across all technology types. Conducting this analysis requires a detailed dataset covering all energy technologies for the relevant utilities. Since such a dataset is not readily available (BNEF has some gaps for Swiss utility investments and large hydro as well as fossil-fuel-based technologies in general), we developed our own dataset using the following methodology:

a. Identification of utilities: Using BNEF data from WP1 and the S&P Global Platts database (which covers a large share of global power plants and their majority owners), we identified a list of utilities providing energy to end-customers with production capacity. These utilities were then classified according to ownership structure (state-owned versus other types), including detailed information on the type of control (e.g., independent or part of a government entity). This classification was conducted using the Orbis database and manual web searches. In total, 84 utilities for Switzerland were included.
b. Power plant data: For each utility, we identified the power plants they currently own or have owned. To achieve this, we manually compared investment details from the BNEF database, S&P Global Platts, the WRI Powerplant Database, and national "Kraftwerks-Listen" where available. Additionally, relevant information from utility websites, including annual reports, was collected. This process allowed us to establish a comprehensive list of power plants for each utility, including the share of ownership. The dataset also records the technology type (covering both new RE and conventional energy), installed capacity in MW, year of construction or acquisition, and, if applicable, the date of sale or decommissioning. Where available, the exact location and ownership type (directly owned or via an SPV or investment company) are also included.

2.2.1.2 Qualitative analysis

The core of WP2 is the qualitative analysis of investment decisions, based on expert interviews with key Swiss investors, including both financial investors and utilities. Semi-structured interviews were conducted with decision-makers involved in international RE investments across all Swiss utilities with foreign RE activities, comprising nine state-owned utilities, two cooperatives, and one predominantly publicly held utility. Additionally, two of the largest Swiss financial investors were interviewed, along with one investment consortium jointly founded and owned by several state-owned utilities.

Interviews were conducted between November 2024 and September 2025 via Zoom or Teams, with durations ranging from 22 to 50 minutes. All interviews were conducted under the Chatham House Rule; consequently, no references to individual participants or their institutions are disclosed. Most participants had long tenures within their organisations, enabling them to reflect on historical investment decisions.

For the qualitative analysis, all interviews were recorded, transcribed, and coded in MAXQDA24, using a bottom-up coding approach.

2.2.2 Results

2.2.2.1 Key Swiss RE investors

To inform our WP2 case studies, we generated an initial overview of the key Swiss investors (see Figure 8). Notably, we observe that a relatively large number of utilities – including smaller ones – have been actively investing in RE, both domestically and internationally. Accordingly, this overview of key investors served as a guide for selecting relevant interview partners for the subsequent qualitative analysis.

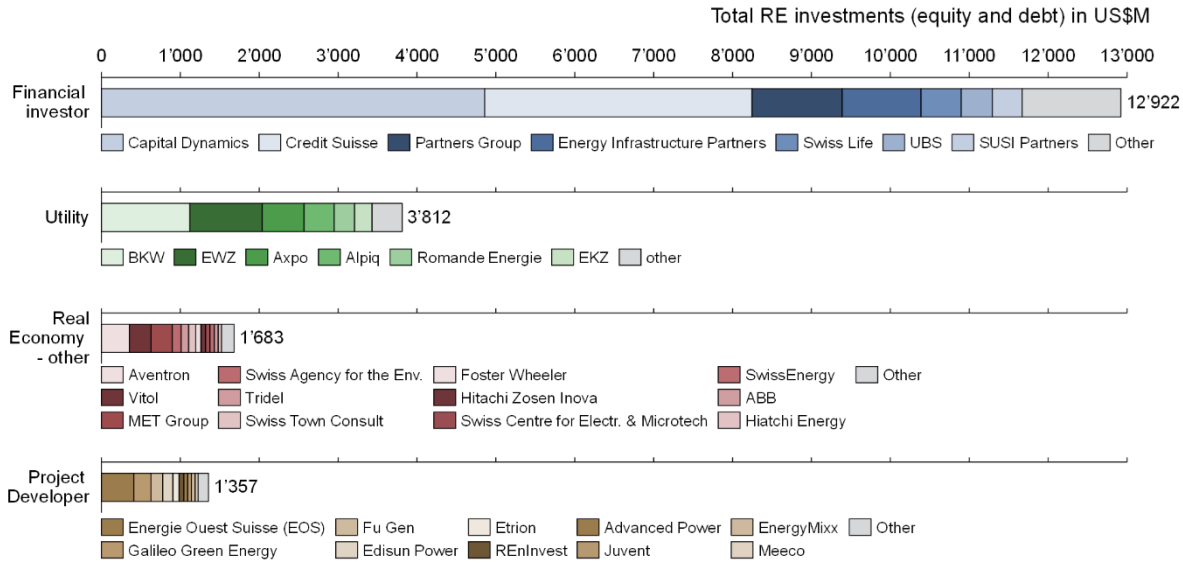


Figure 8: Total RE investments by investor per investor type for Swiss investors. Data is aggregated across all RE technologies (onshore and offshore wind, solar photovoltaics (PV), solar thermal, biomass and waste, small-scale hydroelectric, and marine energy) from 2004 to 2022 and shown in 2020 US$.

2.2.2.2 Drivers for international investment into RE

Reasons for RE investments

The interviews revealed that economic motivations – primarily pursuing business opportunities – are the sole driver of investing into RE assets for financial investors. In contrast, utilities typically report three categories of motivations: economic, regulatory or mandate-driven, and societal. Economically, utilities aim to identify attractive investment opportunities, align generation capacity with customer demand, reduce exposure to volatile energy markets, and respond to growing customer expectations for "green power." Regulatory drivers include explicit mandates, such as those arising from public votes or municipal decisions, as well as anticipatory strategies, such as investing ahead of potential quota schemes. Beyond these practical and regulatory considerations, many utilities emphasise a societal responsibility to contribute to a sustainable energy system, support the transition to net zero, and uphold their mandate to ensure energy security in Switzerland.

Barriers to investments in Switzerland

Based on the interviews, investing in RE projects in Switzerland presents considerable challenges, prompting many investors to focus on opportunities abroad. A primary barrier is the complex and frag-

mented regulatory environment, characterised by numerous approval procedures that differ across cantons and municipalities. The lack of standardised processes or fast-track mechanisms – common in other countries – prolongs project timelines and increases administrative uncertainty. These regulatory and permitting hurdles are further compounded by the possibility of late-stage vetoes or appeals, resulting in unpredictable delays and elevated investment risk.

Limited land availability and low public acceptance pose additional constraints, restricting projects to relatively small scales, making them more expensive and potentially unprofitable. Switzerland's dense population and reluctance to allocate large areas for RE make it difficult to identify suitable sites, while negotiations with landowners are often lengthy. Available land is frequently in locations that are more difficult to reach and service – for example, alpine regions with high capital costs and logistical challenges, or lowland areas with suboptimal wind conditions. Local opposition, often motivated by landscape preservation and nature protection, further reduces deployment potential.

Market and structural limitations also contribute to the challenge. The domestic market remains relatively small and underdeveloped, with few equipment suppliers or specialised service providers, driving up project costs. Inflexible project terms – requiring repeated revisions when technologies or components become unavailable during extended approval phases – further reduce attractiveness. Collectively, these regulatory, spatial, and market barriers explain why many investors channel their RE capital abroad, where frameworks are more predictable, scalable, and economically viable. This is particularly true for financial investors, who typically have more rigid risk/ return requirements. This means they both have to ensure a certain overall portfolio return for their investors and at the same time cannot take on the associated risk large energy developments in Switzerland would entail (unless they are dedicated venture capital funds specialized in high-risk investment), Utilities, in contrast, can accept lower returns for the sake of local deployment, highlighting a key distinction explored in the following section.

It is important to note that these challenges listed primarily apply to utility-scale projects (the focus of this project). By contrast, investment momentum in rooftop PV and other small-scale installations remains high, driven by simpler permitting, higher public acceptance, and more flexible project structures, which continue investments supported by utilities within Switzerland. A main challenge highlighted by the interviewed utilities for this technology is that government-owned buildings particularly are often subject to monumental protection, making it costly and difficult to install rooftop PV while complying with these regulations.

The roles of financial investors versus utilities

The roles of financial investors and utilities in RE investments differ markedly, particularly within the domestic Swiss context. While utilities continue to pursue RE projects in Switzerland despite regulatory and economic challenges – sometimes accepting lower profitability to contribute to national decarbonization goals – financial investors generally refrain from investing domestically, as prevailing conditions do not provide the returns that adequately compensate for the risks. Financial investors emphasise that their return thresholds vary by country, reflecting differences in technology- and market-specific risk. In Switzerland, these risks are frequently considered too high. There are very few existing plants available for acquisition (that might offer lower risk opportunities) and many financial investors (for example due to fund mandates) cannot take on development risk. Further, new projects have very long lead times (during which capital would have to be reserved) and in many cases projects might not even come to fruition, which starkly increases risks. The finding that investor types require markedly different return levels in Switzerland aligns with earlier research from the SWEET EDGE programme, which analysed the cost of capital for various investor categories, albeit with a focus on smaller-scale projects (Đukan & Steffen, 2025). That work similarly shows that, for most technologies, the cost of capital for financial investors is several percentage points higher than for utilities.

Abroad, however, the distinction between the two investor types becomes less pronounced. For most utilities, international investments are largely financial in nature, as the electricity generated is not supplied directly to the home market. Nevertheless, utilities retain a distinct position compared to purely financial investors. Through their involvement in project development, construction, maintenance, and operation, they add tangible value and influence cost structures and project competitiveness. Their operational and maintenance activities, combined with a strong commitment to the Swiss market, mean that their geographical footprint is generally concentrated in neighbouring or Western European countries, unlike financial investors, who operate over a wider range and often focus on very large projects in collaboration with local utilities. Smaller utilities, in particular, however cannot participate in very large-scale investment opportunities.

Financial investors typically more strongly rely on debt financing, which enables them to act competitively, particularly in low-interest-rate environments. However, this reliance on financial conditions can make them more sensitive to market volatility: as interest rates rise, utilities often remain active while financial investors retreat. The two investor types also differ in their evaluation criteria. Financial investors primarily focus on asset-level cash flow and return on investment, whereas utilities assess projects based on EBIT contributions and strategic fit within broader corporate portfolios. This long-term, system-oriented perspective allows utilities to tolerate short-term fluctuations in revenue or production and to retain assets over extended periods, even when returns are delayed or uncertain. As a result, utilities are typically less purely return-driven and more willing to assume risks – such as exposure to merchant markets without guaranteed feed-in tariffs – that financial investors tend to avoid.

Increasingly, utilities act as partners to financial investors by providing operational and energy management expertise or by establishing investment platforms for joint participation. Such collaborative models leverage the financial capacity of institutional investors alongside the technical know-how of utilities, enhancing the effectiveness and resilience of RE investment ecosystems.

2.2.2.3 Deep-dive financial investors

As we observed from the data analysis and interviews, financial investors invest exclusively abroad. Accordingly, relative to domestic investments, Swiss RE investments abroad are higher than those of most other countries. However, Switzerland has a very large and strong financial sector. In our financial investor deep-dive, we therefore explored how the engagement of Switzerland's financial sector in international RE investments compares to that of other countries, controlling for sector size. To this end, we plotted international RE investments (from BNEF data) against the financial assets of the financial corporations' sector for each country (see Figure 9).

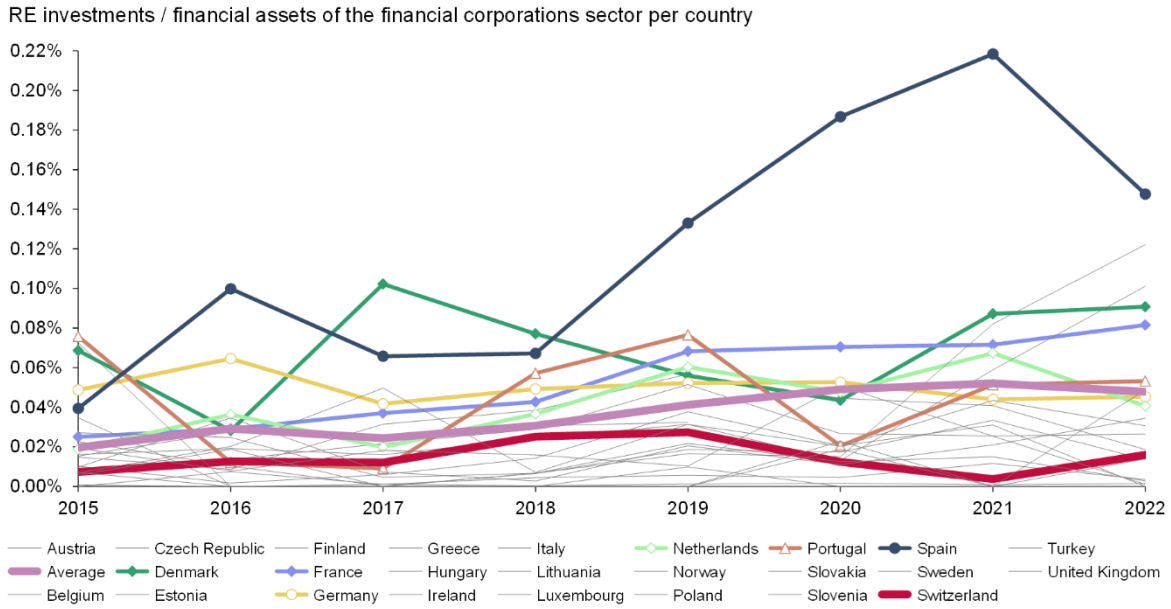


Figure 9: International RE investments in relation to financial assets of the financial corporations sector per country. RE data is aggregated across all RE technologies (onshore and offshore wind, solar photovoltaics (PV), solar thermal, biomass and waste, small-scale hydroelectric, and marine energy). Financial assets of the financial corporations' sector data is taken from Eurostat for all countries except Switzerland, where data is from the Swiss National Bank. All data was initially converted into million 2020 US$ values before comparison. Only Switzerland, average, and countries above average are coloured.

The analysis shows that Switzerland's international RE investments, relative to the size of its financial sector, fall below the European average. In contrast, countries such as Spain, Denmark, France, Germany, Portugal, and the Netherlands display particularly high ratios (above average), reflecting a stronger alignment between financial sector capacity and international RE investment activity. To better understand these differences, we conducted additional analyses comparing Switzerland's investment patterns with those of these "leading" countries.

Figure 10 highlights the largest investors by country. Across most countries, these investors are predominantly banks. In Switzerland, however, only two banks feature among the largest investors, and to a much smaller extent. The only other country where investments are mainly driven by investment and pension funds is Denmark, where the Copenhagen Infrastructure Partners fund – one of the largest infrastructure funds globally – accounts for nearly 50% of all RE investments.

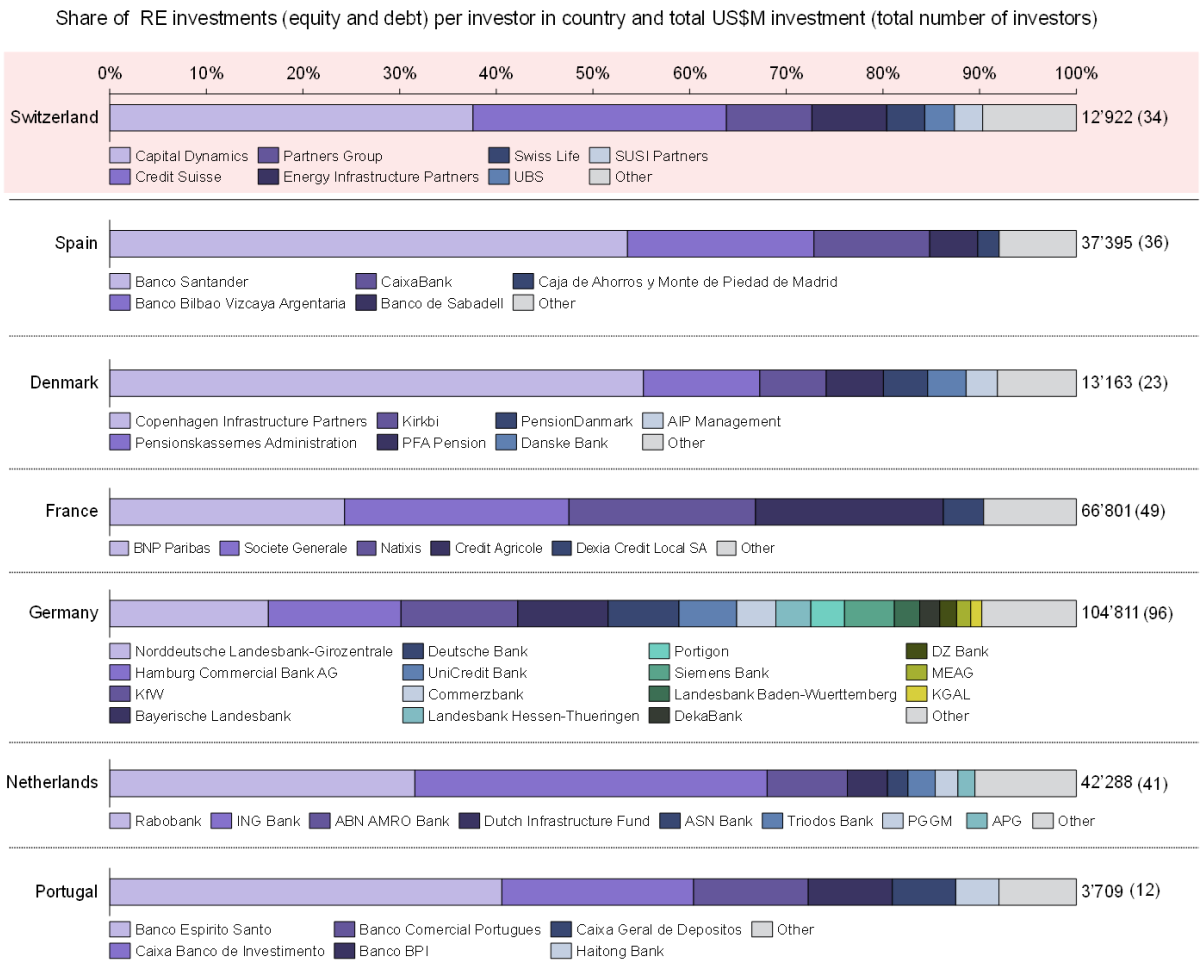


Figure 10: Share of international RE investments per investor for comparison countries and Switzerland. Data is aggregated across all RE technologies (onshore and offshore wind, solar photovoltaics (PV), solar thermal, biomass and waste, small-scale hydroelectric, and marine energy) from 2004 to 2022. Investors making 90% of total investments (ordered by size of investments) shown individually, the remainder is aggregated in “other”. Total investment shown in 2020 US$. In brackets, total number of investors.

To further explore potential differences between Swiss financial investors and those in the comparison countries, we examined additional characteristics of these investments, including the region of the invested assets, the technology of the assets, and the type of financing in terms of financial instrument and transaction type (see Figure 11).

Regarding asset location, there are no major differences across countries, except for Switzerland, where a relatively large share of investments flows to the US. This is largely driven by the Swiss-headquartered asset management fund managing US pension money, which we described in the WP1 analysis. This fund has a strong focus on solar PV investments in the US. This pattern is also reflected in the distribution of investments by technology (Figure 11B), which highlights the fund’s concentration in solar PV. The graph also shows a prominent focus on offshore wind projects by Danish investors, which is consistent with Denmark’s pioneering role in that technology. (Johansen, 2021).

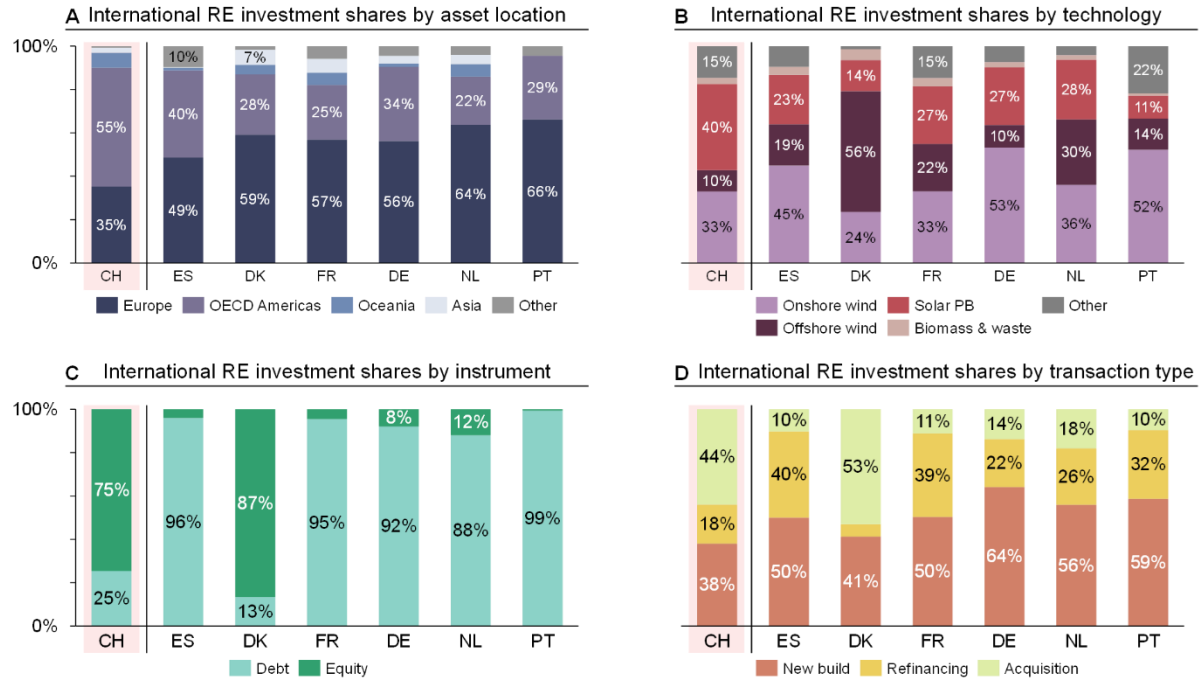


Figure 11: Shares of International RE investments for comparison countries and Switzerland. A. By asset location. B. By technology. C. By financial instrument. D. By transaction type. Except for 10B, data is aggregated across all RE technologies (onshore and offshore wind, solar photovoltaics (PV), solar thermal, biomass and waste, small-scale hydroelectric, and marine energy) and from 2004 to 2022.

More prominent differences between Switzerland, Denmark, and the other countries emerge in terms of financial instruments. Consistent with the observation that fewer banks rank among the top investors in Switzerland and Denmark, financial investors in these countries predominantly provide equity financing, whereas in other countries the majority of capital is provided as debt. This pattern is also reflected in transaction types: Switzerland and Denmark have a much higher share of acquisitions, which are typically financed by equity, in contrast to refinancings, which are generally financed through debt. Notably, Swiss investors have the lowest share of investments in actual new-build projects, at 38%, compared with other countries (except Denmark), where the share of new-build projects is at least 50%.

2.2.2.4 Deep-dive Utilities

As outlined in the methods section, we created a novel dataset detailing the power plant holdings of Swiss utilities, covering both conventional and new RE projects. Analysis of this dataset reveals substantial differences in the patterns and strategies of Swiss utilities regarding international investments across different technology types (see Figure 12). While conventional energy is generally more likely to be installed domestically, this primarily applies to hydro and nuclear power. More carbon-intensive technologies, such as gas and coal, have predominantly been acquired abroad. In contrast, for new RE technologies, investments are largely made internationally, with the exception of biomass.

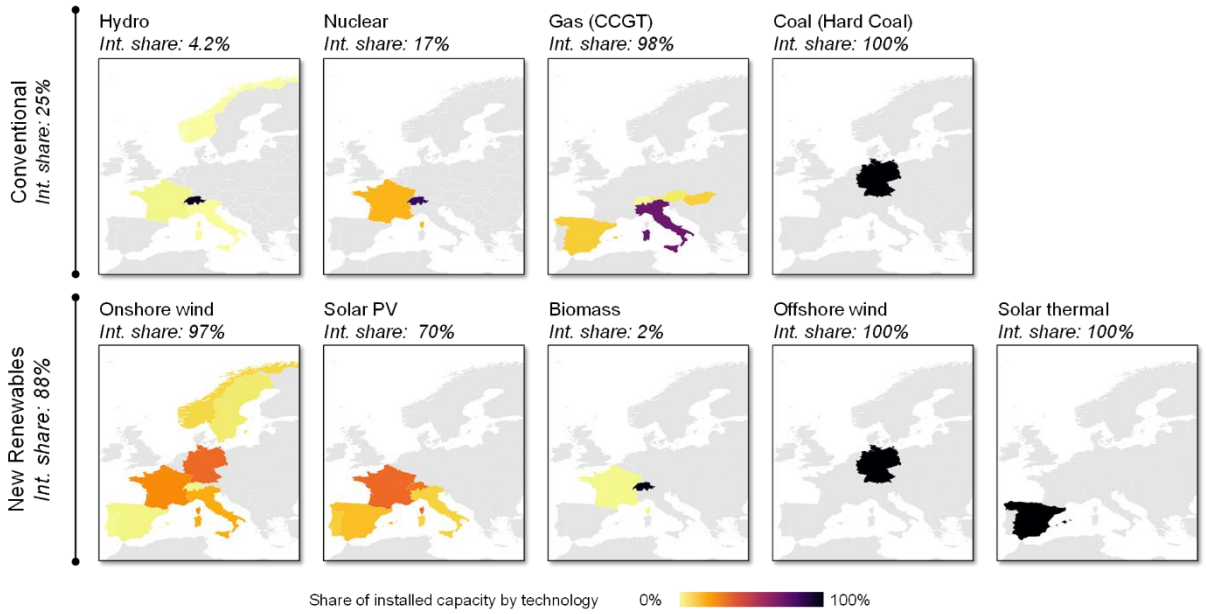


Figure 12: Share of installed capacities domestically and internationally by technology. Data shows all current holdings of installed capacity of Swiss utilities. Note that for this view we excluded investments that have been sold again (as was for example the case with several conventional power plants in the past years).

We further observe that international investments in new RE technologies remain entirely within Europe, with a particular focus on countries close to Switzerland, often sharing a common language. Insights from the qualitative analysis provide additional understanding of the factors driving these investment choices and the resulting patterns.

Drivers for investment decisions

Although Swiss utilities have not invested in a very broad range of countries or technologies, all interviewed utilities emphasised diversification – by geography or technology – as a central principle in their investment strategies. Approaches to entering new countries, however, differ: some decisions are opportunity-driven, arising from existing contacts and networks, while others follow a more strategic process, beginning with defined target countries and technologies before identifying suitable projects. Despite these differences, the criteria used to evaluate countries and projects are remarkably consistent across utilities.

Country selection

When selecting countries for RE investments, utilities consider a combination of strategic, institutional, and practical criteria. The first category relates to familiarity and presence: prior investments, existing customers or business activities, local employees or partners and networks, and knowledge of the language and culture all reduce the perceived risks of entering a market. Geographical proximity to Switzerland further strengthens this effect, not only by offering potential advantages for energy imports but also by facilitating cultural and political understanding.

A second set of criteria concerns the regulatory and policy environment. Utilities place strong emphasis on supportive schemes – most notably feed-in tariffs or auctions but also contracts for difference and compensations for negative prices – as well as stable and transparent frameworks that minimise the risk of sudden policy changes, such as unexpected additional taxes. Simplified approval procedures, favourable tax regimes, designated land for RE development, and flexibility in planning requirements further enhance a country's attractiveness.

The third theme relates to financial and economic conditions. Utilities closely consider exchange rate risks and, while most rely primarily on balance sheet financing, they view the availability of local bank

financing as a positive signal of manageable risk. Political stability and legal security are equally important, with EU countries often regarded as particularly attractive due to their strong and reliable legal frameworks.

Finally, market maturity and potential play a crucial role. Utilities prefer countries where RE technologies are already established and technologically mature, as this reduces uncertainties. Positive experiences of other investors further reinforce a country's appeal, signalling a viable and manageable market. High levels of social acceptance also increase attractiveness, by lowering the likelihood of opposition and delays in approval processes. Additionally, utilities often consider the country's technical RE potential – such as favourable wind or solar conditions – as an important factor in their investment decisions.

Project selection

Beyond diversification across location, technology, and country, several additional criteria guide utilities in selecting specific projects. Some of these are broadly shared across the sector, while others vary depending on company size or strategic orientation. The most fundamental requirement is profitability: expected returns must meet internal thresholds to secure approval from decision-makers, typically an investment committee or the utility's board of directors. Closely linked to this are expected load hours, which are central to assessing a project's economic viability.

Utilities also tend to prioritise projects that involve trusted partners or build on existing local activities, as such collaborations reduce risk and facilitate smoother project execution. Project size constitutes another key consideration: while all investors emphasise the need for sufficient scale – ideally several megawatts – smaller utilities must avoid overly large commitments to limit concentration risks. When engaging in larger projects, they often form "investor clubs" with peer utilities. Larger players, by contrast, typically seek projects of significant size to match their operational scale and investment capacity.

When acquiring existing plants, the technical condition of the asset and the complexity of its ownership or investment structure become decisive factors. Relatedly, some larger utilities have shifted away from holding minority stakes, preferring full ownership and control over the asset. The ability to operate and manage the plant directly is also seen as a source of added value, making operability and serviceability – such as reliable access or proximity to on-site personnel – important selection criteria.

Over time, many utilities have moved upstream, engaging earlier in the development phase of RE projects rather than limiting themselves to acquiring fully built assets. In these cases, they prefer opportunities that allow them to influence key parameters such as feed-in tariffs, procurement conditions, or project design. This shift reflects a broader trend of utilities expanding into project development to strengthen control and value creation. For international investments, the interviews indicate that this evolution often follows a gradual, stepwise pattern: utilities typically first gain familiarity with a market – sometimes through existing activities such as energy trading – before acquiring operating plants, then progressing to turnkey projects, and eventually engaging in early-stage development. Some utilities only acquire projects once permits are secured, while others go further, developing projects from scratch and securing land rights, often in partnership with local developers. Repowering projects, in particular, are frequently developed in-house, allowing utilities to leverage their technical expertise and operational experience.

The shift toward earlier-stage engagement is driven by both market dynamics and utilities' strategic considerations. As competition for ready-built assets intensifies and their availability declines, in-house development provides utilities with a means to secure new opportunities and enhance profitability. Many also emphasise that their deep understanding of energy markets enables them to add genuine value during the development phase – whereas acquiring fully constructed assets offers little room for differentiation. However, the degree to which utilities embrace a development role varies widely and reflects their overall strategy and risk appetite. Some have made project development a core pillar of their business model, even offering development services to external investors. Others, particularly those managing co-investment funds with institutional investor partners, consciously avoid such activities, as the elevated risks inherent in project development often conflict with the more conservative investment profiles of their collaborators.

Learning
A further central theme that emerged consistently across interviews is the importance of learning. Entering a new country – or even working with an unfamiliar technology – inevitably involves a steep learning curve. To mitigate associated risks, utilities commonly begin by collaborating with experienced developers or joining “investor clubs” and funds, allowing them to gain exposure in a lower-risk environment. Through these early steps, they gradually build the capabilities required for more independent engagement.

This learning process unfolds across several dimensions. Utilities acquire technological expertise, familiarity with transaction processes and due diligence, and robust risk management practices. Equally important are practical insights gained during on-site activities, such as construction phases and the handling of unforeseen challenges. Over time, these experiences help establish networks of experts, suppliers, and local partners that become essential for successful project execution.

Importantly, these learnings are not confined to international operations. Utilities report that the knowledge, experience, and procedural improvements gained abroad also strengthen their domestic activities. Enhanced credibility and trust with local stakeholders – particularly in regions where scepticism toward renewable projects persists – further amplify this benefit. With growing confidence, some utilities have even begun partnering with newer or less-established market entrants, helping them gain a foothold while simultaneously expanding their own reach and influence internationally.

2.3 WP 3 – Policy levers for international investment inflows

Given the strong emphasis on the importance of support policies for investment country choice identified in WP2, WP3 turns to examining the role of policy levers and their impact on international investments. Specifically, we aim to determine whether such policies play an even greater role in shaping international investment decisions compared to RE investments in general. To investigate this, we employ a longitudinal research design with a confirmatory approach to test a series of hypotheses on how overall policy frameworks and specific policy instruments influence both domestic RE investments and cross-border investment flows. Drawing on existing literature on climate policy, cross-border investment, and investor behaviour, we formulated and tested the following four hypotheses:

H1a: Higher policy ambition leads to higher investment volumes in solar and wind assets.

H1b: Higher policy ambition leads to higher foreign shares of investment in solar and wind assets.

H2a: Quantity-based mechanisms (RPS) result in lower investment volumes in solar and wind assets than price-based mechanisms (FITs and auctions).

H2b: Quantity-based mechanisms (RPS) lead to lower foreign shares of investment in solar and wind assets than price-based mechanisms (FITs and auctions).

2.3.1 Method

The analysis covers 48 countries over the period 2010 to 2022 and employs multivariate OLS panel regressions with country and time fixed effects to assess how climate policy influences total and foreign RE investments. The sample includes major greenhouse gas emitters and leading recipients of RE asset finance, primarily high- and upper-middle-income countries. Climate policies are treated as key determinants of investment destinations, consistent with FDI theory, which posits that country-specific advantages guide investor decisions. The dependent variable captures greenfield investment inflows in solar and wind projects, excluding refinancing and M&A transactions.

2.3.1.1 Data

Investment data is taken from the BNEF dataset constructed in WP1. Climate policy data come from the OECD's CAPMF database (1990–2023), covering 49 countries. Two indicators of policy ambition are used: policy stringency (support level, scaled 0–10) and policy density (number of active climate policies). Only electricity-sector policies were considered. For hypotheses H2a and b, we distinguish between market-based (e.g., feed-in tariffs, auctions, carbon pricing) and non-market-based instruments (e.g., coal bans, renewable planning). Due to a structural break in CAPMF data in 2010, analyses using policy density and stringency were limited to 2010–2022.

Control variables from the World Bank include GDP per capita, inflation, exchange rates, political stability, carbon intensity of electricity, and energy import dependence. These account for macroeconomic, institutional, and energy-sector conditions expected to influence RE investment levels and foreign investment shares.

2.3.1.2 Regression models

In the country and year fixed effects panel regression, we use country-clustered standard errors to account for the present heteroskedasticity and serial correlation. For hypothesis H1a and H2a, we use the following model:

$$\%\frac{TRE_{ij}}{GDP_{ij}} = \alpha + \beta X_{ij-l} + \gamma C_{ij-l} + d_i + d_j + \varepsilon_{ij-l} \quad (1)$$

where, TRE_{ij} is the total annual investment volumes in solar and wind in country i and year j, while GDP_{ij} represents the annual GDP, used to control for scale effects within countries. α are the unobserved fixed-effects, X_{ij} the explanatory variables, and C_{ij} the controls. The dummy variables d_i and d_j correspond to country and year respectively, and l represents the lag factor. Equation 1 includes the following controls in all its uses, with only the explanatory variables changing: inflation, log(GDP per capita), carbon intensity of the electricity sector, political stability, and the dependence of energy imports.

Further, the following model was used for hypothesis H1b and H2b:

$$\%FRE_{ij} = \alpha + \beta X_{ij-l} + \gamma C_{ij-l} + d_i + d_j + \varepsilon_{ij-l} \quad (2)$$

Here, $\%FRE_{ij}$ is the percentage share of foreign investment inflows in solar and wind per country i and year j, with the remaining variables having the same aforementioned definitions. Both models employ the same explanatory variables and controls, with the exception of relative exchange rates, which are only included in the second model.

2.3.1.3 Lag structure and timeline assumptions

Given the longitudinal design of the analysis, it is reasonable to lag the explanatory variables by one or more periods. In the context of this research, this reflects the understanding that investors require time to respond to the environment in which they operate. In addition, including a lagged dependent variable can help address dynamic endogeneity and potential reverse causality. We tested lags of 0–3 years; however, the final results are presented using one-year lags (i.e. X_{t-1}). Investment year is given by the date of deal close, and the policies by their year of implementation. Investment timelines vary greatly depending on project types and the regulatory requirements of the countries in which they are built. Thus, identifying the time of treatment (i.e. when investors incorporate policy in their decision-making) remains a challenge in establishing a causal relationship.

2.3.1.4 Linear hypothesis test

The second sets of hypotheses (H2a and H2b) propose that price-based mechanisms (PBM) have a greater effect than quantity-based mechanisms (QBM) on total RE investment, as well as foreign investment shares. To test this, we constructed a linear hypothesis test to determine whether the coefficients of the respective variables showed significant differences in magnitude. A Z score was calculated, as defined in the following equation:

$$Z = \frac{\beta_1 - \beta_2}{\sqrt{SE_{\beta_1}^2 + SE_{\beta_2}^2}} \quad (3)$$

In computing the Z-score we used the country-clustered standard errors and estimates. As a one-tailed test, if the Z-score exceeded the critical value of 1.29 for 10% significance, we could accept a significant difference between the coefficient estimates.

2.3.2 Results

2.3.2.1 Policy ambition

The following subsection presents and discusses the econometric results related to the first pair of hypotheses: the impact of policy ambition on total RE investment and foreign RE investment shares. Table 1 summarizes the regression coefficients, with country-clustered standard errors reported in brackets below each estimate.

The results suggest that policy density has a significant positive effect on total RE investment relative to GDP. It is to be noted that this finding should be interpreted with some caution due to the model's relatively low overall explanatory power, as indicated by the Wald test statistic. Additionally, there is some visible cross-correlation between policy density and investment: countries and years with higher policy density tend to have higher levels of RE investment. To test the robustness of this relationship, the year-on-year change in policy density (ΔDEN) was included in the regression model with the same controls. This variable, however, proved statistically insignificant. The same procedure was applied to policy stringency, which also shows cross-correlation with investment levels. Surprisingly, neither the stringency nor its delta exhibited significant explanatory power for total RE investment. Again, the full models failed to demonstrate overall significance, and control variables had limited impact on the dependent variable. Based on these mixed and inconclusive results, Hypothesis 1a cannot be confidently accepted. It should be noted, however, that the policy mix included a large number of different policies beyond targeted instruments such as feed-in tariffs, and more specific instruments are examined in the second set of hypotheses.

The results for foreign investment are more robust. Models (2a)–(2d) exhibit significant explanatory power and explain a higher share of variance compared to the corresponding models for total investment. Both policy density and stringency are positively and significantly associated with foreign investment, and the year-on-year change in stringency is likewise significant. These results suggest that increases in policy support – particularly in terms of stringency – are associated with higher shares of foreign RE investment. In other words, more stringent policy mixes, as well as a greater number of policies (even beyond PBM or QBM instruments), appear to play an even more important role in guiding international investments than they do for domestic ones.

	%TRE/GDP				*%FRE*			
Independent variable (t-1)	(1a)	(1b)	(1c)	(1d)	(2a)	(2b)	(2c)	(2d)
DEN	0.027*				7.32***			
	(0.014)				(2.61)			
STR		0.025				9.40**		
		(0.025)				(3.66)		
ΔDEN			0.020				3.52	
			(0.019)				(2.25)	
ΔSTR				0.042				4.92*
				(0.044)				(2.81)
c_INF	-1.7×10^{-5}	-3.39×10^{-6}	-1.78×10^{-5}	-1.71×10^{-5}	-0.016***	-0.011***	-0.019***	-0.019***
	(2.6×10^{-5})	(2.48×10^{-5})	(3.35×10^{-5})	(3.3×10^{-5})	(0.004)	(0.004)	(0.004)	(0.004)
c_logGDPpc	-0.119	-0.129	-0.006	0.006	-63.6*	-66.6**	-59.0	-57.8
	(0.210)	(0.209)	(0.267)	(0.259)	(32.8)	(31.1)	(41.1)	(40.9)
c_CARB	0.0002	0.0002	0.0001	9.4×10^{-5}	0.084**	0.072**	0.092**	0.089**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.031)	(0.029)	(0.037)	(0.038)
c_PS	0.016	0.022	0.047	0.049	1.81	4.55	2.13	2.59
	(0.048)	(0.049)	(0.053)	(0.053)	(7.42)	(7.63)	(6.99)	(6.88)
c_EI	-0.0003	-0.0003	-0.0003	-0.0003	-0.193***	-0.188***	-0.141*	-0.143*
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.058)	(0.067)	(0.081)	(0.082)
c_ER					0.016***	0.018***	0.015***	0.015***
					(0.002)	(0.002)	(0.002)	(0.002)
Observations	528	528	484	484	528	528	484	484
R^2	0.297	0.295	0.332	0.335	0.424	0.422	0.413	0.412
Within R^2	0.009	0.006	0.007	0.011	0.082	0.079	0.052	0.051
Wald (joint nullity)	0.846	0.223	0.714	0.853	32.5***	20.8***	27.0***	25.6***
Mean VIF (POLS)	1.47	1.46	1.35	1.36	1.48	1.46	1.37	1.37

Notes: All regressions include country and year fixed-effects, with country clustered standard errors using R's `fixest` package. The Wald test has a χ^2 distribution, testing the joint-nullity of coefficients in the explanatory variables (Marques & Fuinhas, 2012). The mean variance inflation factor (VIF) is computed by running the regressions in a pooled OLS setting. ***p<0.01; **p<0.05; *p<0.1

Table 1: Fixed-effects regression results: total RE investment relative to country GDP and % foreign investment in RE with respect to aggregate policy density and stringency.

2.3.2.2 Price- versus quantity-based mechanisms

To evaluate how price-based mechanisms (PBM) and quantity-based mechanisms (QBM) differ in their effects, the stringency of both variables was included in the same regression models as previously specified. Table 2 summarizes these results.

The overall explanatory power of the models is significant, except for model (3b). Similar to the previous results, this is driven by the limited contribution of the deltas and control variables, which remain low in magnitude and mostly statistically insignificant. In contrast, the main explanatory variables – the stringency of PBM and QBM – yield statistically significant results, indicating that both types of mechanisms are positively associated with total RE investment and foreign RE investment shares. Specifically, a one-unit increase in PBM stringency is associated with a 0.03% increase in total investment relative to country GDP, whereas a similar increase in QBM stringency corresponds to a 0.017% increase. At first glance, the PBM coefficient appears nearly twice as large as that of QBM. To formally test the hypothesis that $\beta_{pbm} > \beta_{qbm}$, the Z-score was calculated based on equation (3). For model (3a), the resulting Z-score is 1.09, which falls below the critical value of 1.29. As such, we cannot reject the null hypothesis of no significant difference between the two coefficients, failing to confirm Hypothesis 2a. Nonetheless, the findings confirm that both PBM and QBM are significant drivers of total RE investment. However, it should be noted that also in this case, Δ_{pbm} and Δ_{qbm} remain insignificant.

In the second set of models, (4a) and (4b), both PBM and QBM positively influence foreign investment shares, with PBM significant at the 5% level and QBM at the 10% level. Again, the coefficient for PBM

is larger than that of QBM. However, the calculated Z-score comparing the two coefficients is 0.451 – lower than in the previous test – indicating that the difference is not statistically significant either.

	TRE / GDP		*%FRE*	
Independent variable (t-1)	(3a)	(3b)	(4a)	(4b)
pbm	0.030***		2.43**	
	(0.011)		(1.08)	
qbm	0.017***		1.79*	
	(0.006)		(0.896)	
Δpbm		0.003		1.70
		(0.011)		(1.14)
Δqbm		-0.004		-0.048
		(0.013)		(1.36)
c_INF	-5.32×10^{-6}	3.09×10^{-5}*	-0.007**	-0.005*
	(1.62×10^{-5})	(1.8×10^{-5})	(0.003)	(0.003)
c_logGDPpc	0.007	0.075	-17.4	-11.3
	(0.091)	(0.108)	(17.5)	(17.3)
c_CARB	0.0001	0.0002*	0.006	0.011
	(0.0001)	(0.0001)	(0.018)	(0.020)
c_PS	-0.044	-0.058	0.091	-1.40
	(0.042)	(0.048)	(5.84)	(5.83)
c_EI	0.0001	8.65×10^{-5}	-0.008	-0.014
	(0.0003)	(0.0004)	(0.049)	(0.042)
c_ER			0.012***	0.013***
			(0.001)	(0.001)
Observations	836	836	836	836
R^2	0.299	0.270	0.356	0.348
Within R^2	0.046	0.007	0.038	0.026
Wald (joint nullity)	2.66***	1.40	49.4***	40.9***
Mean VIF (POLS)	1.38	1.31	1.40	1.32

Notes: All regressions include country and year fixed-effects, with country clustered standard errors using R's `fixest` package. The Wald test has a χ^2 distribution, testing the joint-nullity of coefficients in the explanatory variables (Marques & Fuinhas, 2012). The mean variance inflation factor (VIF) is computed by running the regressions in a pooled OLS setting. ***p<0.01; **p<0.05; *p<0.1

Table 2: Fixed-effects regression results: total RE investment relative to country GDP and % foreign investment in RE with respect to the stringency of PBM and QBM.

3 Conclusions and outlook

In our research, we examined the international investment behaviour of Swiss actors in RE, as well as the policy conditions shaping investment flows into foreign countries. Using three complementary analytical lenses – a macro-level overview of investment patterns, detailed analyses of different investor types, and an econometric assessment of policy effects – our findings reveal a nuanced picture of Switzerland's role in the global energy transition: modest in domestic deployment, yet deeply interconnected, particularly within the European energy landscape, through its financial and corporate actors.

Switzerland's international RE investments stand out as remarkably high relative to its domestic utility-scale projects. Although absolute investment volumes are modest compared with larger economies, Switzerland ranks among the top seven countries in terms of net capital outflows to RE projects abroad. This indicates that Swiss actors – despite limited space and generation capacity of utility-scale projects at home – still play a role in supporting the global energy transition. These outflows are primarily directed toward European markets, particularly neighbouring countries such as Germany, France, and Italy, as well as Nordic countries and the United States. The strong European focus reflects both geographical proximity and institutional familiarity, while the U.S. investments highlight the influence of globally active asset managers headquartered in Switzerland. At the same time, our data show that Switzerland's international RE investments by financial investors remain below average when measured relative to the size of its financial sector. Despite the country's vast pool of capital, Swiss financial institutions allocate a comparatively small share of assets to RE compared with peers in Spain, Denmark, France, Germany, Portugal, and the Netherlands. In particular, Swiss banks play a very limited role compared with those in these other countries. Taken together, these findings suggest that while Switzerland contributes to international RE finance, it still underleverages its potential as a global financial hub for sustainable energy investment.

In addition, the qualitative analyses shed light on why domestic investments remain very limited. Financial investors are primarily guided by the risk–return profiles of larger investment opportunities, and current Swiss conditions do not meet these requirements. Complex and fragmented permitting procedures, stringent land-use constraints, and limited project scalability make domestic projects both very risky and financially unattractive. Further, hardly any existing projects can be acquired, meaning Swiss financial investors largely refrain from investing into renewable energy projects locally. Utilities, while facing the same challenges, still pursue some domestic projects – driven by public mandates, long-term strategic objectives, or a societal commitment to energy security and sustainability. Given their dominant position in the Swiss market and their ability to invest strategically rather than being purely return-driven, also means that utilities effectively occupy most viable opportunities – leaving very limited room for other investor types to participate. This of course further reduces the role financial investors can play domestically. Notably, smaller-scale projects such as rooftop solar PV have gained momentum within Switzerland, with utilities actively investing and supporting end-customers seeking to install panels. Utilities of course also retain extensive expertise and historical investments in large hydro power but often mention that domestic capacity is largely saturated. Interestingly though, rather than exporting their hydro expertise abroad, most utilities use international markets as an opportunity to diversify their technology portfolios with new technologies – particularly wind and solar. When investing abroad, the distinction between utilities and financial investors becomes less pronounced than in domestic activities. Nevertheless, even in international markets, utilities maintain a more hands-on role through project development, operations, and maintenance. Increasingly, hybrid models are emerging in which utilities and financial investors collaborate, combining financial capacity with technical expertise.

Finally, the analysis of policy impacts on international investments underscores the critical role of policy ambition in shaping investment decisions. While the results for total RE investment are mixed, we find a clear and positive relationship between climate policy stringency and foreign RE investment flows. In other words, stronger and more comprehensive policy frameworks tend to attract greater international capital, confirming that policy credibility remains a central determinant of cross-border investment in RE. Both price-based and quantity-based mechanisms contribute to this effect, although the difference in

their relative impact is not statistically significant, highlighting that a diverse policy mix is most effective for countries seeking to attract international investment.

For Swiss policymakers, these findings point to three complementary priorities. First, improving domestic investment conditions – by streamlining permitting processes, reducing regulatory fragmentation, enabling larger-scale projects, and implementing both price-based and quantity-based support policies – would not only help utilities expand domestic projects but could also attract additional domestic and potentially even foreign capital. Second, Switzerland is already highly interconnected with the European energy system through its investments. To fully reap benefits beyond financial returns, stable integration into this system – including in terms of energy trade and usage – is essential. Third, to strengthen Switzerland's role as a financial catalyst for the global energy transition, the financial sector, particularly Swiss banks, would need to increase engagement in RE asset investing, for example through the provision of debt, as observed in most leading comparison countries.

In summary, Switzerland's contribution to the energy transition already extends beyond its borders, but with improved domestic conditions and clearer financial policy signals, it could evolve from a supporting player into a leading enabler of global RE investment.

4 National and international cooperation

The project team collaborated with the Sweet EDGE consortium and contributed a chapter – based on and extending this research – to the second Renewable Energy Outlook published in 2025.

5 Publications and communication

Until now, one article was published in peer-reviewed scientific journals based on our FINDIT research:

- Eberhart, S., Schmidt, T. S., Steffen, B., & Egli, F. (2025). The internationalization of renewable energy finance. IScience, 28(5). https://doi.org/10.1016/j.isci.2025.112367

Further, results from the FINDIT research contributed to the Renewable Energy Outlook report published by the Sweet Edge Consortium and was

- Van Liedekerke, A., Gjorgiev, B., Savelsberg, J., Eberhart, S., Schmidt, T., Steffen, B., Sansavini, G., Wen, X., Sasse, J.-P., & Trutnevyte, E. (2025). Renewable Energy Outlook II for Switzerland. ETH Zurich. https://doi.org/10.3929/ethz-b-000735887

In addition, two further publications are planned that build on but go beyond the content presented in this report:

- Eberhart, S. Schmidt, T.S., Steffen, B., & Egli, F. The role of public utilities in the international diffusion of the energy transition. *in preparation.*
  - ➔ An analysis of whether state-owned utilities can be used as an instrument to enable the spatial diffusion of new energy technologies
- Eberhart, S. Schmidt, T.S., Steffen, B., Fesenfeld, L., & Pesavento, P. The impact of climate policy and power market structure on investment inflows in renewable energy assets. *in preparation.*
  - ➔ An analysis how climate policy and power market structures influence total RE investment and the share of foreign investment

Finally, the findings of the project have been presented at the internal International Sustainability Transitions Conference 2023 in Utrecht as well as the International Association for Energy Economics Conference 2024 in Istanbul.

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7 Appendix

Not applicable