

**Financing a Clean and
Competitive Transition**

**Monitoring Capital Flows to
Sustainable Investments**

Final report

March 2025

Table of Contents

Table of Contents	2
Abbreviations.....	5
Definitions	6
List of figures	8
EXECUTIVE SUMMARY.....	10
PREAMBLE	13
ABOUT THIS REPORT	14
The state of play in the real economy.....	16
Putting the European transition in context.....	16
Doubling down on greenhouse gas emission reductions.....	16
Deeper sustainable transformations require sizeable investments.....	18
Measuring green investments.....	20
The uptake of Taxonomy on the ground.....	20
Taxonomy-aligned investments are concentrated in a few key sectors	23
A wider range of sectors report Taxonomy-aligned revenues.....	25
Measuring the speed of the climate transition through Taxonomy data	27
Measuring corporate transition beyond green investments	28
Estimating investments supporting the transition.....	28
The limits of corporate debt capacity.....	34
Round-up.....	35
The state of play in the financial sector	38
Primary markets	38
The green debt financing landscape.....	38
Green bond flows: A European success story	42
Equity financing – important to support green corporate growth	47
Secondary markets.....	51
EU investment funds are greening their portfolios.....	51
Selected use cases.....	58
Towards a green Savings and Investment Union	58
Background.....	58

The need for more integrated European economies	58
Real economy investments: Distinct regional imbalances	59
Financial transactions are limited to a few countries	62
Round up	64
Sectoral deep dives: Power and car manufacturing.....	65
Setting the scene	65
Real economy investments: Different states of transition between sectors.....	66
Debt financing in the power and car manufacturing sectors.....	69
Financial market dynamics	71
Round up	73
CONCLUSIONS	76
EXTENSIONS.....	78
REFERENCES.....	80
Annexes	82
A1. Schematic representation of the conceptual framework	83
A2. Data quality in reporting taxonomy data	84
A3. Loans	86
A4. Metrics for the transition of financial institutions	88
A5. Tracking progress in clean tech manufacturing	89
Acknowledgements	90

DISCLAIMER

The EU Platform on Sustainable Finance (PSF) is an advisory body that has been established under Article 20 of the Taxonomy Regulation and is subject to the Commission's horizontal rules for expert groups.

This document is not an official European Commission document nor an official European Commission position. Nothing in this document commits the European Commission nor does it preclude any policy outcomes.

This report represents the overall view of the members of the Platform on Sustainable Finance. However, although it represents such a consensus, it may not necessarily, on all details, represent the individual views of member institutions or experts. The views reflected in this report are the views of the experts only. This report does not reflect the views of the European Commission or its services.

The considerations below are compiled under the aegis of the Platform on Sustainable Finance and cannot be construed as official guidance by the European Supervisory Authorities (ESAs). As a result, the views and recommendations do not purport to represent or anticipate any future official guidance and views issued by the ESAs which may differ from the contents of this report.

The inclusion of KPIs in this report cannot be construed as their endorsement or validation, particularly for the purpose of assessing Taxonomy-alignment of exposures or use of proceeds by the PSF, the ESAs, nor the European Commission.

Abbreviations

CapEx	Capital Expenditure
CSRD	Corporate Sustainability Reporting Directive
CSDDD	Corporate Sustainability Due Diligence Directive
DNSH	Do No Significant Harm
EBA	European Banking Authority
ECB	European Central Bank
ESAP	European Single Access Point
ESG	Environmental, Social & Governance
ESMA	European Securities & Markets Authority
ESRS	European Sustainability Reporting Standard
EU GBS	European Green Bond Standard
EUA	European Union Allowances (emissions)
FC	Financial Corporation
GHG	Greenhouse Gases
ICMA	The International Capital Market Association
IEA	International Energy Agency
IPO	Initial Public Offering
KPI	Key Performance Indicator
NACE	Nomenclature of Economic Activities
NFC	Non-Financial Corporation
NFRD	Non-Financial Reporting Directive
NZAOA	Net Zero Asset Owner Alliance
NZBA	Net Zero Banking Alliance
PAI	Principal Adverse Impact
SBTi	Science-based Targets Initiative
SFDR	Sustainable Finance Disclosure Regulation
SLB	Sustainability Linked Bond
SLL	Sustainability Linked Loan

Definitions

Capital flows	Movement of money for the purpose of investment, trade or business operations.
Capital stock	Historic accumulation of net capital flows.
Companies, Enterprises, Corporates	Non-financial undertakings.
Elements of a credible transition	Measurable elements that meet the minimum requirements for credible transition plans in terms of i) ambition and environmental/social integrity ii) transparency/completeness and iii) feasibility as defined in the Platform report on transition plans (EU Platform, 2025a). The features of the core elements are presently plan-oriented rather than performance-driven given current available data. Further described in the subchapter “Measuring corporate transition beyond green investments” as well as in the PSF “Final Methodology on measuring capital flows to sustainable investments”.
Entities	A financial or non-financial undertaking.
Environmentally Sustainable Bond (Green bond)	<p>Regulatory definition: Bond marketed as <i>environmentally sustainable</i> means a bond whose issuer provides investors with a commitment or any form of pre-contractual claim that the bond proceeds are allocated to economic activities that contribute to an environmental objective as per Art. 2 of the EU Green Bond Regulation (OJ, 2023a).</p> <p>Market definition: Bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects (ICMA, 2022). The greenness of the bond is self-defined.</p>
Green loan	There is no regulatory definition of green loans at EU level. Loan instruments and/or contingent facilities (such as bonding lines, guarantee lines or letters of credit) made available exclusively to finance, re-finance or guarantee, in whole or in part, new and/or existing (allegedly) eligible Green Projects (Loan Market Association). <i>See further discussion on regulatory developments in Financial Markets chapter.</i>
Gross flows	Total capital flows in a sense of direction within a defined time period.
Net flows	Total capital flows in one sense of direction netted against flows in the opposite direction within a defined time period.
Primary markets	The issuance of a new financial instrument.

Public sector entities (& expenditure)	Public bodies that are not registered companies (and expenditure of such undertakings).
Sustainability-linked bond	Sustainability-linked bond refer to a bond whose financial or structural characteristics vary depending on the achievement by the issuer of predefined environmental sustainability objectives as per Art. 2 of the EU Green Bond Regulation (OJ, 2023a).
Sustainable finance	Finance to support economic growth while reducing pressures on the environment to help reach the climate- and environmental objectives of the European Green Deal, taking into account social and governance aspects.
Sustainable investment	Sustainable investments as per Art. 2 (17) of the EU Sustainable Finance Disclosure Regulation (OJ, 2019).
Environmentally sustainable investment	Investment in one or several economic activities that qualify as environmentally sustainable under the EU Taxonomy Regulation (OJ, 2020).
Secondary markets	The trade of financial products after first issuance.
Transition	Transition from current climate and environmental performance levels towards a climate-neutral, climate-resilient and environmentally sustainable economy, in a time frame compatible with EU's climate and other environmental objectives, in line with the Paris Agreement as per Art. 2.2 of the European Commission's June Recommendation (OJ, 2023b).
Transition finance	Financing of investments compatible with and contributing to the transition that avoids lock-ins as per Art. 2.2 of the European Commission's June Recommendation (OJ, 2023b). Transition finance differs from general finance and green finance.

Sources: All regulatory references listed above are reported in the Reference list, Introduction section.

Note: Definitions are as much as possible based on regulations. Beyond the scope of regulatory definitions, market practice terminology is referenced. As the regulatory frameworks on sustainable finance evolve, reliance by the methodology on regulatory definitions and standards is expected to increase.

List of figures

Figure 1. Profile of net GHG emissions over 1990-2050 to reach carbon neutrality in the European Union .	16
Figure 2. Sectoral breakdown of 2022 greenhouse gas emissions (horizontal axis) and percentage deviation from 1990 levels (vertical axis).....	17
Figure 3. Time profile of average annual investments needs in the energy system, 2030-2050	18
Figure 4. Top: Sectoral breakdown of average annual investments needs in the energy system, 2030-2050. Bottom: Breakdown of investment needs by end-use subsector.	19
Figure 5. Breakdown of Taxonomy-aligned CapEx by category, 2022-2023	21
Figure 6. Taxonomy-aligned CapEx as share of total CapEx and corresponding volumes by NACE sector, 2023.	23
Figure 7. Detailed breakdown of Taxonomy-aligned CapEx by sector (horizontal axis); Percentage of Taxonomy-alignment (vertical axis), 2023	24
Figure 8. Percentage of Taxonomy-aligned Revenues by sector (horizontal axis); percentage of Taxonomy-alignment in each sector (vertical axis) 2023	26
Figure 9. Measure of the speed of transition at entity level in selected NACE sectors, 2023.	27
Figure 10. From Taxonomy-aligned CapEx to additional CapEx potentially supporting the transition, 2023	30
Figure 11. Taxonomy-aligned CapEx as share of total CapEx for companies with elements of credible transition plans, selected sectors, 2023.....	31
Figure 12. Taxonomy-aligned CapEx as share of total CapEx (left axis) and volumes (right axis) in the manufacturing sector, 2023.	33
Figure 13. Non-Taxonomy-aligned CapEx by tier in the manufacturing sector, 2023.	33
Figure 14. Debt ratios by sector, 2013-2023	35
Figure 15. State of play in the real economy.....	36
Figure 16. Overview of EU green debt financing landscape through key primary markets instruments; total outstanding as of end 2023.	38
Figure 17. EU banks' Taxonomy-aligned lending and lending to other climate change mitigating activities sorted by EU country, Q2 2024	39
Figure 18. Total value of EU-27 green bonds outstanding with Second-Party Opinion by sector (outstanding amounts at face value)	41
Figure 19. Euro area holdings of green debt securities with Second-Party Opinion by sector (outstanding amounts at face value)	42
Figure 20. Global issuance of green bond by global regions and countries (left panel) and by issuer type in the EU (right panel), 2015-2024.	45
Figure 21. Issuance of green bonds in the European Union by NACE section, 2023	46
Figure 22. Average share of outstanding amounts of green bonds by transition category, 2023.....	46
Figure 23. Annual and cumulative volumes of private equity capital invested in the EU and the United States by type of investor, 2010-2024	48

Figure 24. Volume of private equity market in the EU by sector, compound annual growth rates, 2010-2024	49
Figure 25. Public equity issuance in the EU, 2014-2023.....	50
Figure 26. Volumes of public equity issuance in the European Union in selected sectors, 2022-2023.....	50
Figure 27. Framework for monitoring fund flows into sustainable investments.....	51
Figure 28. Number of funds by portfolio share of sustainable investments and Taxonomy-aligned investments, Article 8 funds (left) and Article 9 funds (right).....	53
Figure 29. Aggregate fund portfolio holdings of green bonds by SFDR fund type, in EUR billion (left) and % of portfolio investments (right).	53
Figure 30. Greenhouse gas emissions (2022), per capita GDP and market capitalisation (2023) by country and region relative to EU levels.....	59
Figure 31. Volumes of Taxonomy-aligned CapEx and additional CapEx supporting the transition by European region and number of companies, 2023.	60
Figure 32. Volumes of Taxonomy-aligned CapEx and additional CapEx supporting the transition by EU Member State, 2023.....	61
Figure 33. Bond issuance in EU27 by subregion and type, 2023 (EUR billion).....	62
Figure 34. Total loan GAR and household loan GAR, by bank per country/region, Q2 2024	63
Figure 35. Non-financial corporates loan GAR, by bank per country/region, Q2 2024	63
Figure 36. Public equity issuance by EU region and sector, 2022-2023.....	64
Figure 37. Recent trends in EU low-carbon energy technology developments	65
Figure 38. Breakdown of Taxonomy-aligned CapEx by category in the power and car manufacturing sectors, 2022-2023.....	66
Figure 39. Taxonomy-aligned investments and power sector investments in the EU not captured by the monitoring framework, 2023.	67
Figure 40. From Taxonomy-aligned CapEx to additional CapEx potentially supporting the transition in the power sector, 2023.....	68
Figure 41. Liabilities vs debt ratios in the power and car manufacturing sectors, 2013-2023.	69
Figure 42. Cash-flow decomposition for the power and car manufacturing sectors, 2019-2023	70
Figure 43. Financing patterns of power investments.....	72
Figure 44. Financing patterns of investments in car manufacturing.....	74
Figure 45. Breakdown of Taxonomy-aligned CapEx by strategic technology and environmental purposes. .	89

EXECUTIVE SUMMARY

To inform and guide an orderly, competitive and clean transition, as set out in the EU’s Competitiveness Compass, EU policymakers will require effective tools to track sustainable investments and their financing on a regular basis.

This report presents a new framework for monitoring capital flows into sustainable investments, using EU Taxonomy reporting as the starting point. By consolidating regulatory and market data, it offers fresh insights into the state — and reality — of the transition efforts of large European corporates.

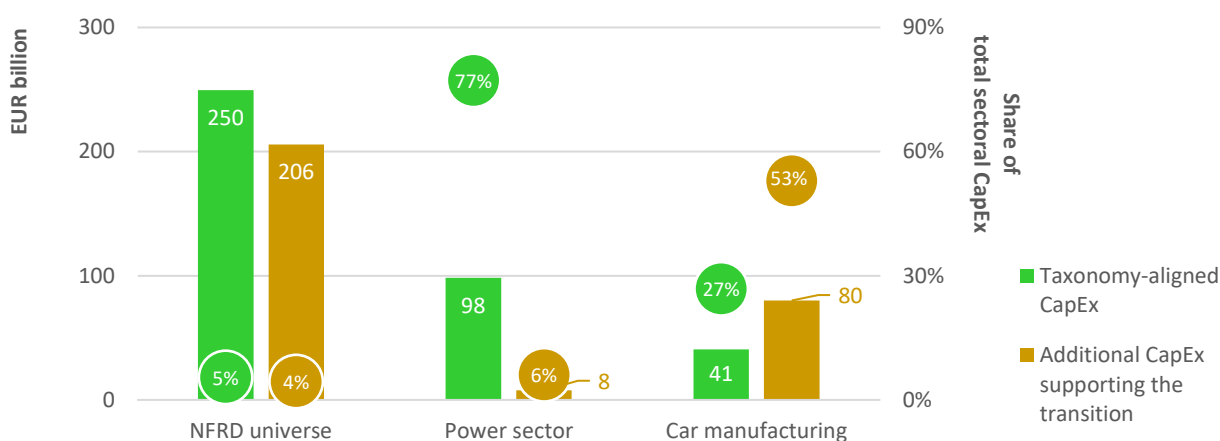
Taxonomy reporting is a highly effective tool for assessing the volume and allocation of sustainable investments. The report is based on disclosures from 2,180 large listed European companies, including data on their Taxonomy-aligned capital expenditure (CapEx). The Taxonomy has proven its ability to mobilise capital towards sustainable investments, a role that may further expand with targeted simplifications. However, its effectiveness could be undermined if the scope of mandatory reporting is significantly reduced.

Key Findings

Sustainable investments are gaining momentum. Taxonomy-aligned CapEx from large listed European companies reached EUR 250 billion in 2023, a 34% increase from the previous year. Half of this was directed toward enabling activities (+40% year-on-year), while transitional activities more than doubled, accounting for 11% of total Taxonomy-aligned CapEx.

Beyond Taxonomy-aligned investments, additional transition-related capital flows are emerging. About EUR 206 billion in investments, while not yet fully aligned with the Taxonomy, potentially contribute to Europe’s transition. Most of this CapEx was directed toward Taxonomy-eligible activities, underscoring the importance of tracking wider investments as part of credible transition plans and measuring partial alignment with the Taxonomy criteria.

A snapshot on the status of transition finance in Europe, 2023



Source: Own analysis based on Bloomberg, Orbis, CDP.

Sectoral trends highlight progress on the transition

- **Electric utilities and grid operators are leading Europe’s energy transition.** They account for a third of all Taxonomy-aligned CapEx. However, clean energy investments, at EUR 200 billion in 2024, remain 30% below the levels needed to meet the EU’s 2030 targets.
- **Carmakers’ transition is well underway.** 30% of car manufacturers’ CapEx (EUR 41 billion) is Taxonomy-aligned, with an additional EUR 80 billion potentially supporting the transition, signalling transformations within the EU automotive industry.

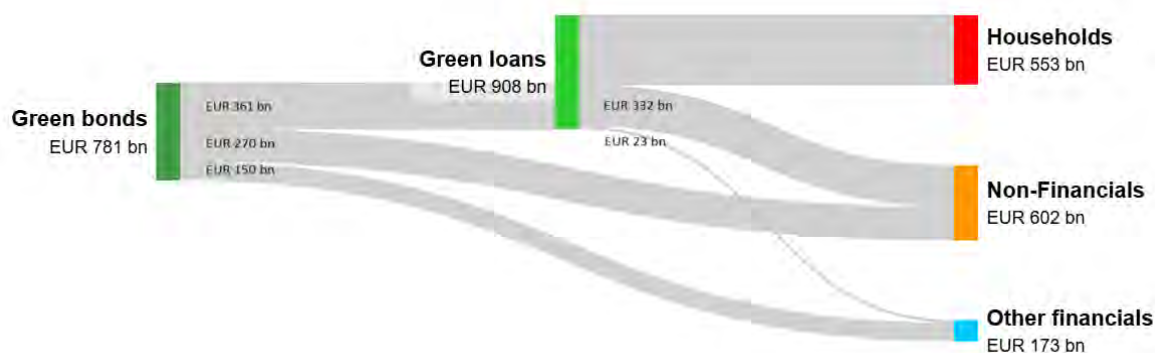
To close the investment gap, significant private capital is needed. The European Commission estimates that at least 7-8% of GDP annually must be directed toward green investments to meet 2030 and 2040 climate targets. The largest gaps remain in industrial decarbonisation, energy supply, and building renovations.

The Role of Sustainable Finance

Retained earnings remain the main source of financing for EU companies’ investments. However, the limited potential to develop profitable projects in the short term highlights the importance of a conducive policy framework, notably in relation to the Clean Industrial Deal. This will help companies invest in new technologies and adapt their business models and ultimately improve their competitiveness and profitability during the transition.

Debt financing dominates sustainable investment flows. Green bonds remain the primary financing instrument, with annual EU issuance exceeding EUR 200 billion since 2021. Outstanding green loans stood at EUR 908 billion in 2023, while outstanding green bond volumes were EUR 781 billion, bringing total green debt finance to EUR 1.69 trillion.

Overview of EU green financing landscape through key primary markets instruments, 2023



Note: The diagram depicts the total value of green debt finance instruments outstanding (stock) in the EU by instrument type as of end 2023.

Sources: ECB, EBA, ESMA, Refinitiv Eikon.

The potential of equity instruments in financing the transition is not fully tapped yet. Equity investments in sustainable sectors averaged EUR 224 billion annually from 2021 to 2023. Private equity and venture capital funds hold EUR 212 billion for sustainability-related activities, but deployment remains uneven.

The EU fund market continues to green despite slower flows into SFDR-registered Article 8 and Article 9 funds. In 2023, these funds represented 59% and 3% of total EU fund assets respectively. The gradual increase in the portfolio share of sustainable investments also suggests that the EU fund industry has not significantly scaled back its offering of sustainability-oriented investment products. EU funds are increasingly holding green bonds (EUR 385 billion as the end of 2023) highlighting their key role in channelling capital from households to finance green investments from EU private and public sector companies.

Geographic disparities persist. Sustainable investments remain concentrated in Western and Northern Europe – particularly France and Germany – where green bond issuance is highest. In contrast, Central and Eastern Europe face acute transition challenges, with limited bankable projects and green finance activity. Green bank lending and investments from private equity and venture funds are also underdeveloped. Establishing a *Savings and Investment Union* and strengthening local disclosures are critical for bridging this gap.

Towards a Generalised Monitoring Framework

A comprehensive framework for tracking capital flows can further support EU policy decisions by integrating data on public investments and household spending. The public sector, particularly through procurement, plays a crucial role in fostering innovation and driving the transition, as highlighted in the Clean Industrial Deal. Expanding the monitoring framework to capture public budgets allocated to transition priorities will provide a clearer picture of the public-private split in transition efforts.

Periodic updates will enable better tracking of sectoral and regional progress, informing the design of targeted transition policies, resilient supply chains and financing strategies for an orderly transition.

PREAMBLE

The joint roadmap for decarbonisation and competitiveness paves the way for the transition in Europe and will set a green industrial revolution in motion with competitiveness at the centre, as set by the *Competitiveness Compass for the EU*. Large investments in new technologies and new business models are indispensable to achieve these objectives. Overall, the European Union will need to scale up its investments by two-thirds (about EUR 620 billion more each year until 2030), relative to average levels over the 2011-2020 period, to pave the way for climate neutrality and a resilient economy by 2050, with the bulk of funding to be mobilised by private entities.

The EU Sustainable Finance Action Plan was developed to steer the reallocation of capital and facilitate transition investments in green technologies and business models. A framework of disclosures and tools has been established to help investors better identify and assess projects with a positive environmental impact. This framework was further complemented by the Recommendation on Facilitating Financing the Transition, which clarifies how transition finance is integrated and expands its scope.

The first waves of sustainability disclosures allow for a stocktake of progress on the allocation of capital flows to sustainable investments. The methodological framework put into practice in this report is an important first step to assess the materiality of private financing contributions to overall Green Deal investment needs, including resource-efficiency and competitiveness. This seminal work provides insights as to whether 1) sustainable finance policy has been sufficiently mainstreamed in financing and investment strategies of financial companies 2) the necessary investments to transform the EU economy are taking place in the real economy 3) relevant entities have access to finance for sustainable investments. Further insights on the quality and availability of reporting data are gathered.

In the absence of an established international framework for the monitoring of capital flows to sustainable investments, this work should also contribute to fostering international cooperation in developing minimum standards for monitoring sustainable finance and transition finance towards sustainable societies.

This endeavour is not without limitations. The methodological work will not go as far as measuring the overall alignment of the European financial system with Green Deal goals. The monitoring of capital flows is centred around *green* capital flows, as well as financial flows supporting the transition. Comparing sectors is challenging due to variations in coverage and eligibility within the Taxonomy, meaning figures should always be interpreted in context to avoid misleading conclusions. The scope of analysis could be expanded with improvements in disclosures and reporting. Broader considerations could include, for example, monitoring detrimental flows, such as fossil fuel investments, the allocation of public funds, and financial flows dedicated to specific environmental objectives.

ABOUT THIS REPORT

This report provides the first snapshot of the state of play within the EU regarding private investments made in sustainable investments, in response to the mandate given to the Platform by the European Commission.

The EU Action Plan on Financing Sustainable Growth (EU Commission, 2018) and the Strategy for financing the transition to a sustainable economy (EU Commission, 2021) aim to mobilise the investments needed to implement the EU Green Deal, and more recently, the Clean Industrial Deal. Together, these initiatives lay the foundation for a sustainable economy based on strengthened European competitiveness and open strategic autonomy.

As part of its Sustainable Finance Strategy, the Commission committed to monitoring an orderly transition of the EU financial system (Action 5(b)) and, jointly with the EU Platform on Sustainable Finance, to developing a robust monitoring framework for sustainable capital flows in the EU. Additionally, the Taxonomy Regulation, Art 20(2) (EU Commission, 2021) mandates that the *“Platform shall monitor and regularly report to the Commission on trends at Union and Member State level regarding capital flows into sustainable investment”*.

This report builds on the methodology developed by the Platform, which introduces the framework and approach for monitoring capital flows to sustainable investments.¹ It primarily relies on reporting data from large, publicly listed companies under the NFRD scope^{2,3} and draws mainly on regulatory data to assess the state of sustainable investments in the real economy and their financing by the financial sector. Additionally, in-depth analysis provides further geographical and sectoral insights.

Corporate financing

The state of play of investments in the real economy is assessed based on Taxonomy-aligned CapEx reported by corporates under the NFRD scope, excluding household and public investments. This analysis is complemented by a methodology that uses proxies to identify companies with core elements of credible transition plans, as outlined in the Platform’s report on corporate transition plans (EU PSF, 2025b). This approach helps identify investments from such companies beyond Taxonomy-aligned CapEx that could potentially support the transition, offering a more nuanced sectoral perspective on transition.

¹ A schematic representation of the conceptual framework is provided in Annex A1.

² Among the 2,180 NFRD entities reporting in the EU, 667 entities reported non-zero values.

³ The Economic and Financial Resilience Unit of the European Commission’s Joint Research Centre was instrumental in the consolidation and mapping of databases.

Patterns in corporate financing are identified to portray the financing of sustainable investments in the real economy. The analysis of debt absorption capacity –along with potential in-built limitations – shows how optimal debt financing structures differ between sectors. In addition, the time evolution of corporate financing by sector is explored using a novel approach. These methodological advances can inform the design of impact-driven policies.

Financial sector trends

The state of play in the financial sector draws on EBA and ECB data to derive the green debt stock in the EU and its distribution across financing instruments, economic actors and users of the capital base. A flow perspective is adopted for the remainder of the financial sector chapter to measure year-on-year changes in capital flows, covering green bonds, as well as public and private equity. The sustainability-labelled bond market appears fairly transparent, whereas the sustainability credentials of public and private equity are currently lacking, prompting more caution in data interpretation.

The primary market is the main focus but net flows in the secondary market, namely fund flows, provide insights on the appetite for sustainable assets and their influence on price formation.

Use cases

Three use cases address different policy relevant perspectives, in line with some of Letta's and Draghi's recommendations (Letta, 2024; Draghi, 2024). A regional perspective is taken on investments and financing sources in the EU. This echoes the Commission objective to develop a sustainable *Savings and Investment Union* and highlights, with caveats, regional disparities in market maturity and volumes of capital flows to sustainable investment. A sectoral perspective is the subject of a second batch of illustrative use cases. The monitoring framework is applied to the specific contexts of the power sector and the car manufacturing sector, which are at the forefront of the transition in Europe.

The state of play in the real economy

Are there enough sustainable investments?

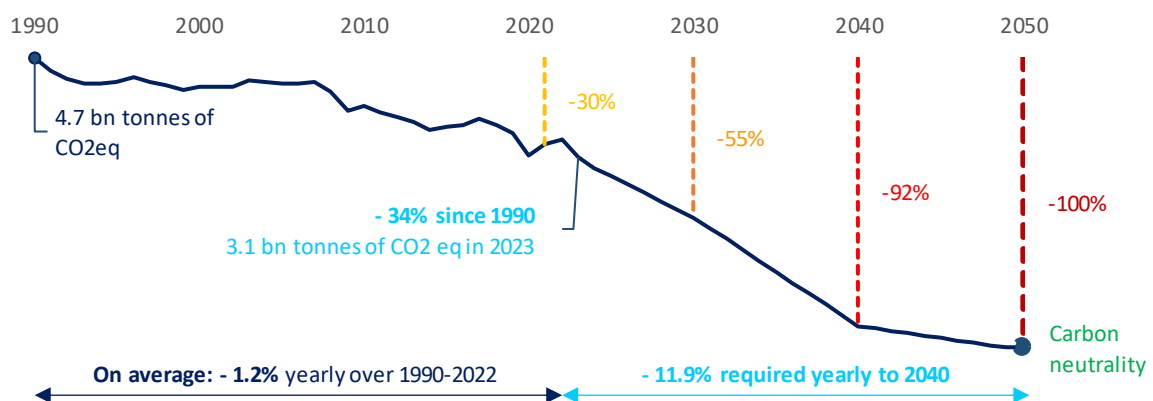
The reporting requirements on Taxonomy alignment for large companies (subject to NFRD) were first introduced for the fiscal year 2023 and have since delivered a wealth of information on the status of sustainable investments in the European Union. This chapter provides a comprehensive overview of the state of play in the real economy, thereby confirming the operability of the methodological framework proposed for a systematic monitoring of investments to sustainable activities.⁴

Putting the European transition in context

Doubling down on greenhouse gas emission reductions

The decarbonisation of the European Union economy is progressing steadily (Figure 1) with over 8% emission reductions in 2023 alone (EU Commission, 2023). The bloc's greenhouse gas emissions are now a third lower than their 1990 level. Despite progress, the pace of annual emission cuts will need to increase substantially to reach carbon neutrality on time.

Figure 1. Profile of net GHG emissions over 1990-2050 to reach carbon neutrality in the European Union



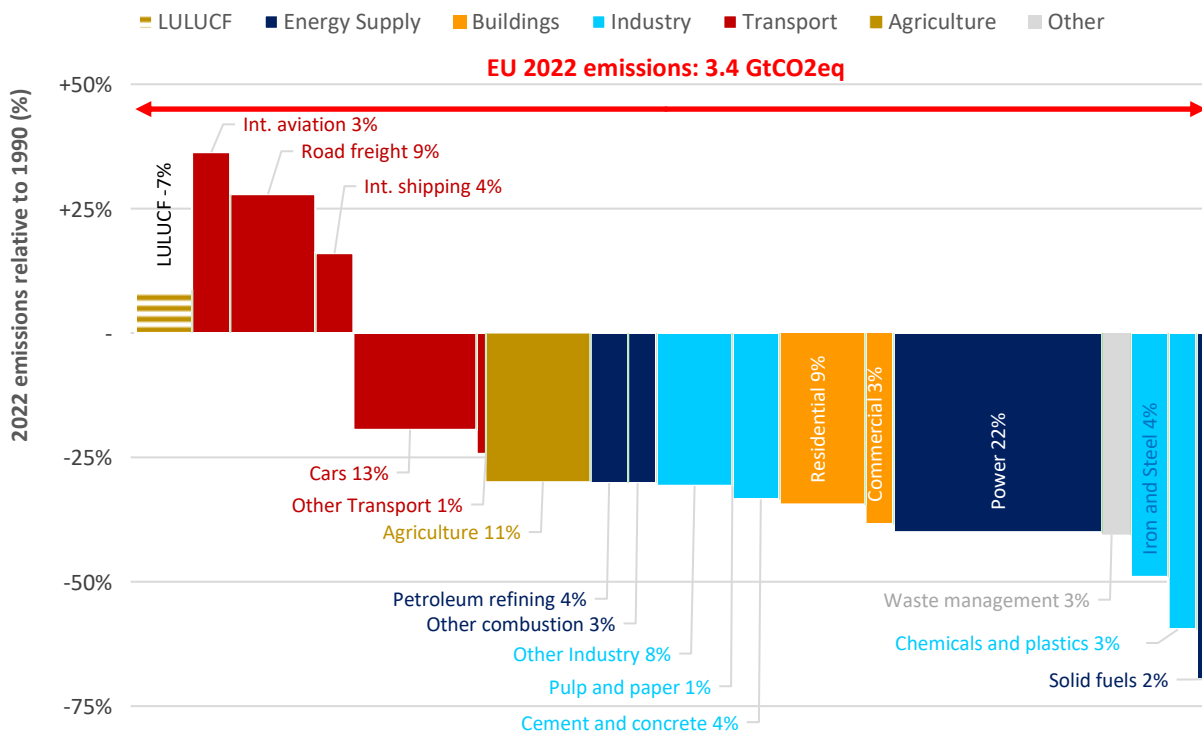
Source: EEA (2024), EU Commission (2024). Note: Projected emission pathway (S3).

A closer look at sectoral contributions to overall emission reductions confirms that progress was made across most sectors (Figure 2). The main sources of emissions can be divided into four groups: chief of them are transport and energy transformations (each accounting for about 30% of EU total), followed by industrial

⁴ For a detailed presentation of the real economy component of the monitoring framework, including data sources, please refer to the joint methodological document.

activities (20%) and buildings (12%). The power sector, the largest single source of GHG emissions with over 20% of the EU total, saw its emissions decrease 40% since 1990 owing to the rapid expansion of low-carbon electricity in the last 15 years. The supply of low-carbon electricity is indispensable for deeper emission cuts in end-use sectors, which despite progress, have not shown notable signs of acceleration in recent years. Emissions from some industrial segments (incl. the chemical sector) are conspicuous: the sizeable improvement in their carbon footprints stemmed mainly from the structural reduction of activity among these energy-intensive industries, rather than truly transformative actions beyond process optimisation and achieved efficiency gains.⁵ A few sectors including aviation, road freight and shipping, exhibit a net increase in emissions since the reference year 1990, as fuel efficiency gains remained insufficient to offset the impact of globalisation and increased activity.

Figure 2. Sectoral breakdown of 2022 greenhouse gas emissions (horizontal axis) and percentage deviation from 1990 levels (vertical axis).



Source: EEA (2024).

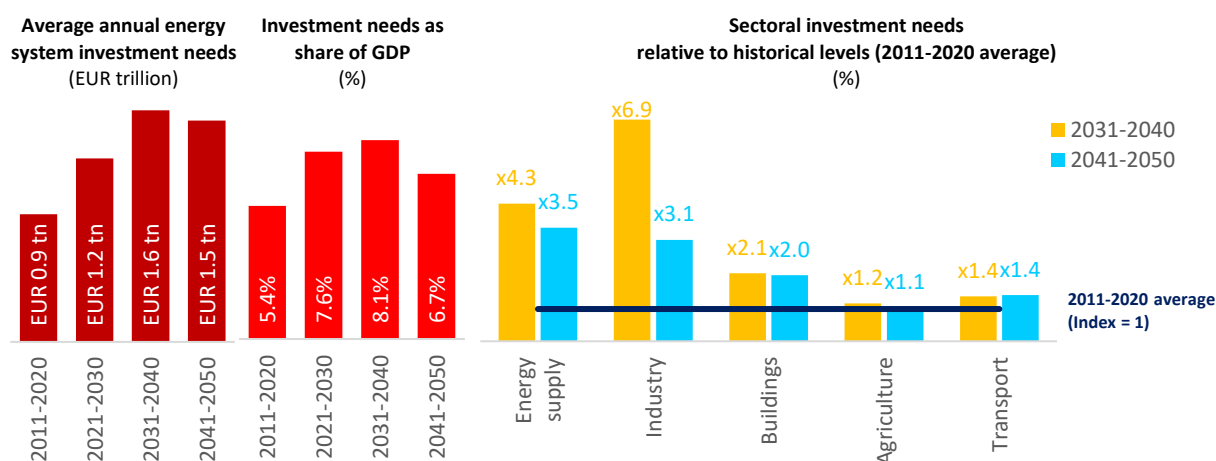
⁵ See EIB (2025) for a more detailed analysis of the drivers underpinning historical emission reductions – or increases – in key sectors.

Deeper sustainable transformations require sizeable investments

The stocktake of corporate investments developed in subsequent sections, takes long term investment requirements as a benchmark to gauge progress towards the achievement of Green Deal objectives. The details of previous assessments to 2030 across all six environmental objectives are detailed in Annex 1. Knowledge gaps, the relative diversity of results across sources and other modelling shortcomings are pinpointed and acknowledged. More details on 2030 investment needs can be found in ECB (2025). In this section, emphasis is given on the most recent Commission assessment of climate-related investment needs, covering the period post-2030 to mid-century (EU Commission, 2024a).

Currently, low-carbon energy investments in the EU lie around EUR 400 billion, 30% below the needs for 2030 according to estimates of the International Energy Agency (IEA, 2023). This represents only a portion of total climate investment requirements. Some funding, for e.g. transport infrastructure developments, is not factored in the IEA analysis. Beyond 2030, as decarbonisation materialises within a broader set of economic activities, low-carbon energy investments are expected to reach EUR 1.6 trillion annually before levelling off after 2040 (EU Commission, 2024b) (Figure 3). The reallocation of large capital sums to meet EU targets by 2030 and achieve net zero transformations by 2050 could make up for 7 - 8% of GDP. This represents about 2.5 percentage points above historical shares of GDP dedicated to low-carbon energy investments, equivalent to levels seen in Europe in the 1970s (Draghi, 2024). According to the Commission projections, the investment gap is largest for industries (a 7-fold increase is expected in the next decade), energy supply and renovation of the building stock.

Figure 3. Time profile of average annual investments needs in the energy system, 2030-2050



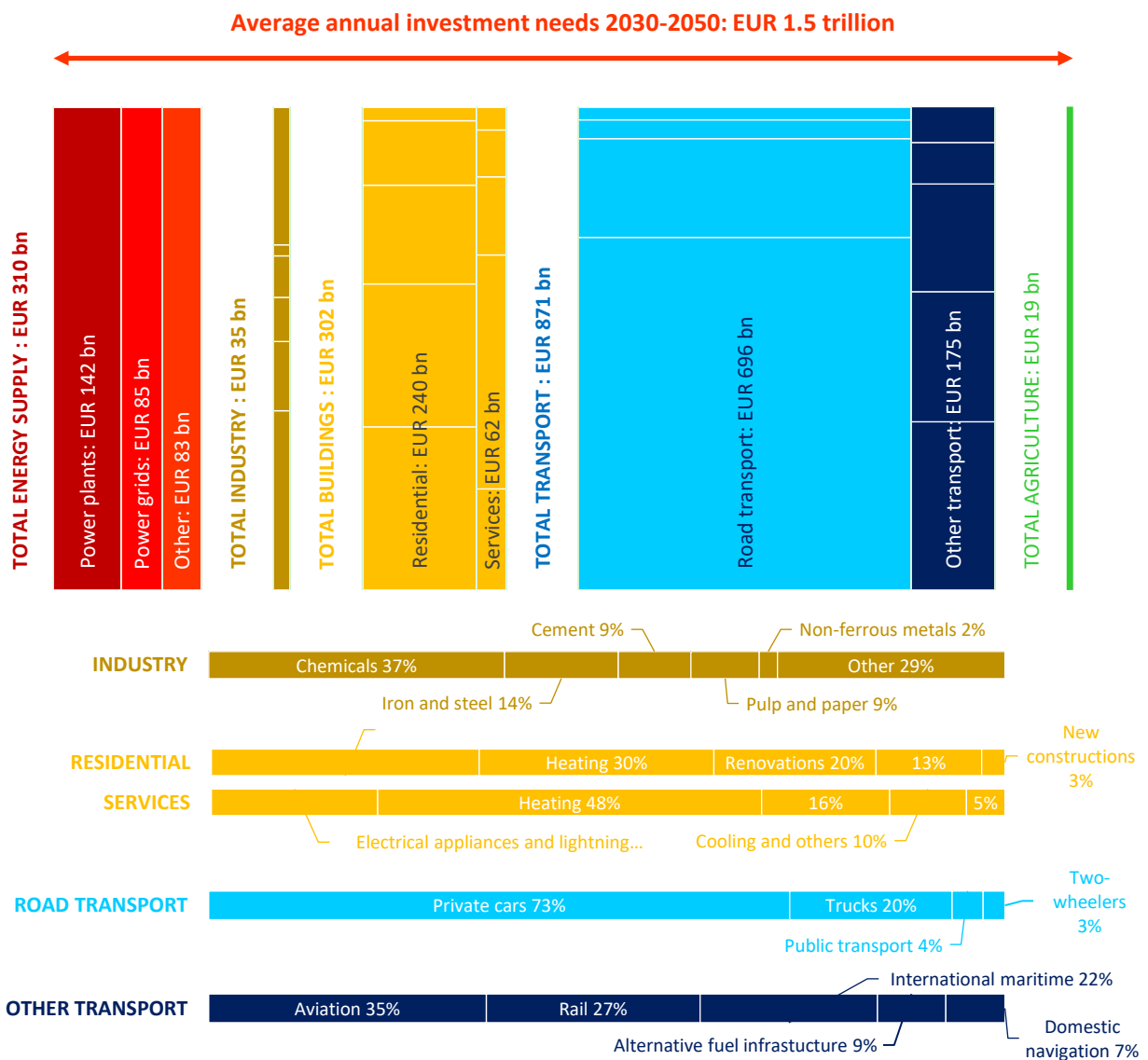
Source: EU Commission (2021, 2024b). Note: 2030-2050 projections in line with the recommended pathway S3.

The sectoral breakdown of climate mitigation efforts laid out in the Commission's assessment provides useful benchmarks to track progress towards the Green Deal targets but should be interpreted cautiously (Figure 4). Those details give a sense of average annual efforts needed in each key emitting sector over relatively

long, i.e. decadal, time frames. Sectoral investment figures result from the volume of abatement needed, the degree of maturity of a sector to absorb low-carbon alternatives to polluting activities and their associated unit costs evolving with technological advances.

At EUR 696 billion yearly (44% of EU total), the overhaul of road transport systems (incl. cars and trucks) comes across as the most capital-intensive building block of EU decarbonisation, disproportionately higher than the sector’s contribution to current EU emissions (22% of EU total). This reflects notably the difficulty to address emissions from freight. The capital requirement per unit of avoided emissions is therefore larger than other key sources of emissions.

Figure 4. Top: Sectoral breakdown of average annual investments needs in the energy system, 2030-2050. Bottom: Breakdown of investment needs by end-use subsector.



Source: EU Commission (2024b). Note: 2030-2050 projections in line with the recommended pathway S3.

The transformation of electricity supply, also at the origin of 22% of EU emissions in 2022, necessitates about EUR 230 billion yearly after 2030, broadly in line with investment volumes seen currently. By contrast, investment needs to address direct and indirect emissions from industrial processes appear low (EUR 35 billion) and may deserve further scrutiny.⁶

Measuring green investments

The uptake of Taxonomy on the ground

By end of October 2024, a total of 2,180 companies had an obligation to report on Taxonomy-alignment, covering all sectors of the economy and accounting for EUR 12.9 trillion in assets (excl. the financial sector's assets).⁷ The first wave of sustainable finance data confirms the uptake of the Taxonomy on the ground. Overall, EUR 250 billion of CapEx was earmarked as Taxonomy-aligned by companies in regulatory scope, a 34% increase relative to 2022.^{8, 9, 10} The manufacturing sector is the most represented one, with over a third of reporting companies and half of total assets in scope (EUR 6 trillion). Some emphasis is given subsequently on the transition among EU manufacturers, given their pivotal role in the greening of European supply chains and, by extension, in the bloc's competitiveness. A sectoral breakdown of companies' universe and their assets is provided in Box 1.

Half of the reported CapEx for 2023 was directed to enabling activities, a 40% increase since the previous year (Figure 5). Transitional activities made up for 11% of Taxonomy-aligned CapEx, more than double than the year prior. The rest of CapEx (about EUR 100 billion) is by and large low carbon. Almost 99% of the CapEx is contributing significantly to the climate mitigation objective. The reported sums of significant contribution to the climate adaptation objective remain generally very modest. The Delegated Act outlining technical

⁶ Funding net zero initiatives in the chemical sector alone, one of the hardest-to-abate sectors, would require EUR 35 billion yearly, with a financing gap – the difference between required investments and available CapEx – estimated at EUR 12.6 billion (Accenture, 2022).

⁷ According to a recent ECB survey (with limited representation of large companies), a majority of corporates deem the costs of environmental reporting too high and see it as an obstacle to securing finance for planned investments in climate transition (ECB, 2025).

⁸ Bloomberg serves as the reference data source for Taxonomy-related data summarised in this document. This figure is corroborated by Morningstar Sustainalytics's own consolidation of data on Taxonomy-aligned CapEx for the year 2023 (Morningstar Sustainalytics, 2024). However, an equivalent volume of Taxonomy-aligned CapEx was earmarked by Morningstar Sustainalytics for 2022, possibly due to difference in proprietary universes of public-interest companies under NFRD scope. Of note, the comparability of reported Taxonomy data across data providers may deserve further scrutiny given differences in data timeliness and company universes.

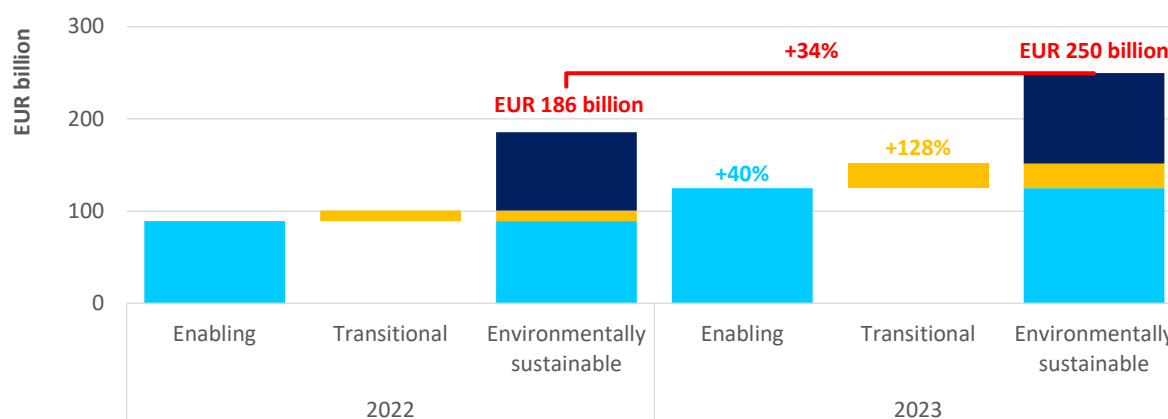
⁹ Another EUR 4.3 billion in Taxonomy-aligned CapEx was reported by non-EU companies (two-thirds, a quarter and 9% of this total respectively from Norwegian, Swiss companies and UK companies).

¹⁰ Eurostat has initiated the modelling and estimation of corporate investments in climate change mitigation measures within the EU, drawing on its *Structural Business Statistics database*. This assessment is made without considering eligibility criteria set by the EU Taxonomy. For the time being, the sector coverage is limited to industry, construction and services. Other economic sectors and public administration are outside the scope. A more comprehensive collection of data is planned to be made available in 2026 through Eurostat's *environmental accounts*, covering additional sectors and economic activities. According to this first estimation, corporate investments in climate mitigation amounted to €95.3 billion in 2023, equivalent to 0.55% of the EU GDP. Half of these investments were made in the Transportation and storage sector. Renewable energy production, transmission and storage represented 34% of the total.

screening criteria for the other four environmental objectives was published in June 2023, but CapEx data is not yet available.

In the absence of any standardised framework for reporting on group-level data, 10% of the amount of aligned CapEx might be affected by potential double counting reported between parent companies and their subsidiaries. More details on this issue can be found in the Appendix.

Figure 5. Breakdown of Taxonomy-aligned CapEx by category, 2022-2023



Note: The data scope is described in Box 1.

Sources: Bloomberg, Orbis.

In 2023, almost a third of companies reporting on Taxonomy (667 out of 2,180 entities) disclosed non-zero values of their Taxonomy-aligned CapEx (Table 1). The cohort of companies that reported in 2022 (508 entities) drove the increase in Taxonomy-aligned CapEx in 2023 (+EUR 62 billion in net terms). The majority of these companies (306 entities) increased their Taxonomy-aligned CapEx in 2023 relative to 2022 (+EUR 73 billion). In addition, 159 entities started reporting in 2023, pointing to the broadening base of companies reporting on Taxonomy, and adding EUR 8 billion in Taxonomy-aligned CapEx.

Table 1. Accounting of Taxonomy-aligned CapEx reporting between 2022 and 2023

	Volume (EUR billion)	Number of entities (Count)
Taxonomy-aligned CapEx reported in 2022	186	586
Discontinued reporting in 2023	-6	-78
New reporting in 2023	+8	+159
Reporting in both 2022 and 2023	+62	508
<i>Increase in reported CapEx</i>	<i>+73</i>	<i>306</i>
<i>Identical reported CapEx</i>	<i>+0.1</i>	<i>9</i>
<i>Decrease in reported CapEx</i>	<i>-11</i>	<i>193</i>
Net increase in reporting	+64	+81
Taxonomy-aligned CapEx reported in 2023	250	667

Note: The table summarizes changes in Taxonomy-aligned CapEx reporting of non-zero values. Plus (+) and minus (-) signs preceding numbers indicate the direction of year-on-year changes.

Sources: Bloomberg, Orbis.

Box 1: Companies in NFRD scope

Sectoral breakdown of EU entities reporting Taxonomy-aligned CapEx; Total assets, 2023

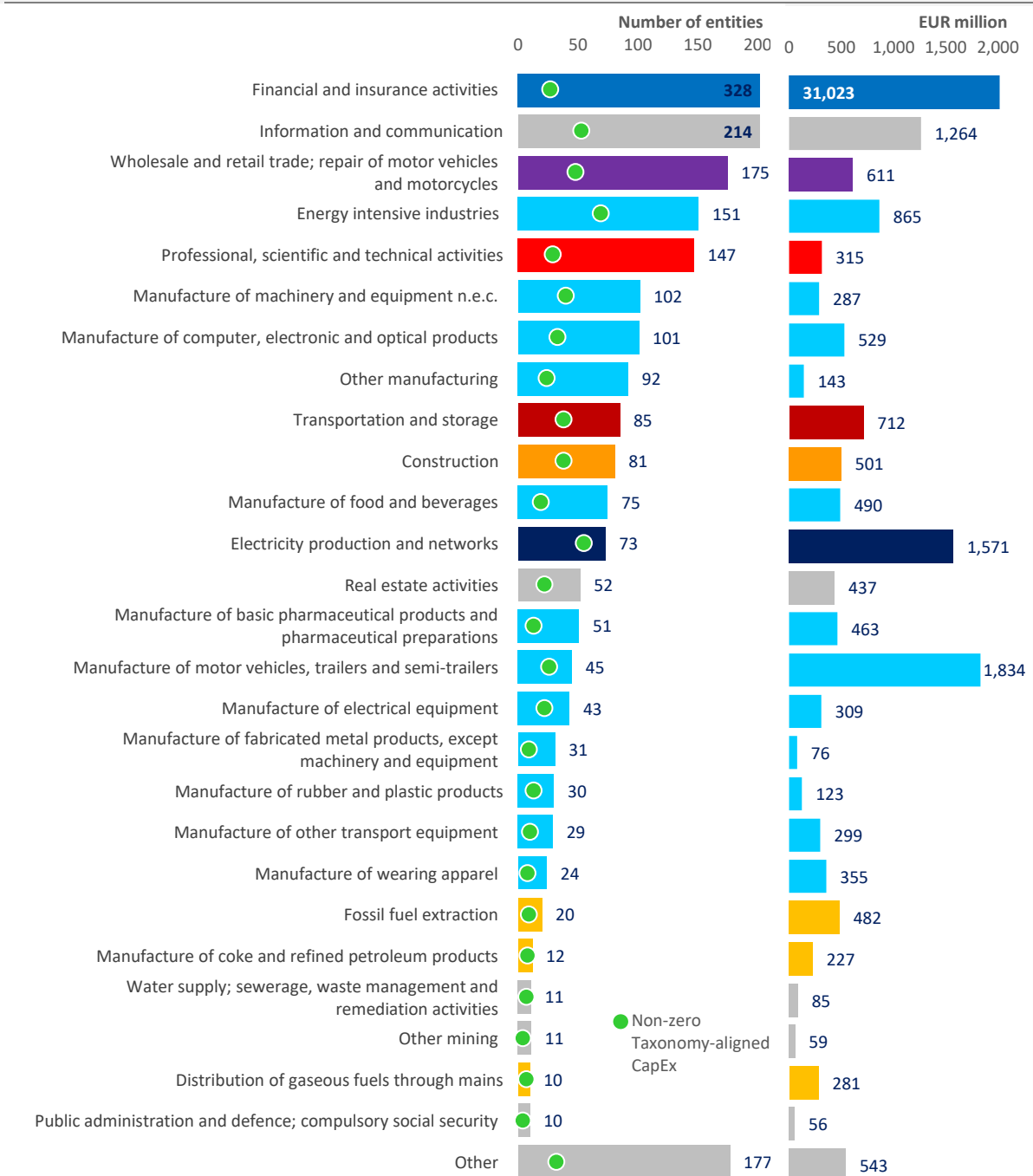
Number of entities in NFRD scope reporting in the EU: 2,180

Total assets EU: 12.9 trillion

Number of entities reporting non-zero Taxonomy values in the EU: 667

[outside the EU: 194]

[total excl. the financial sector]



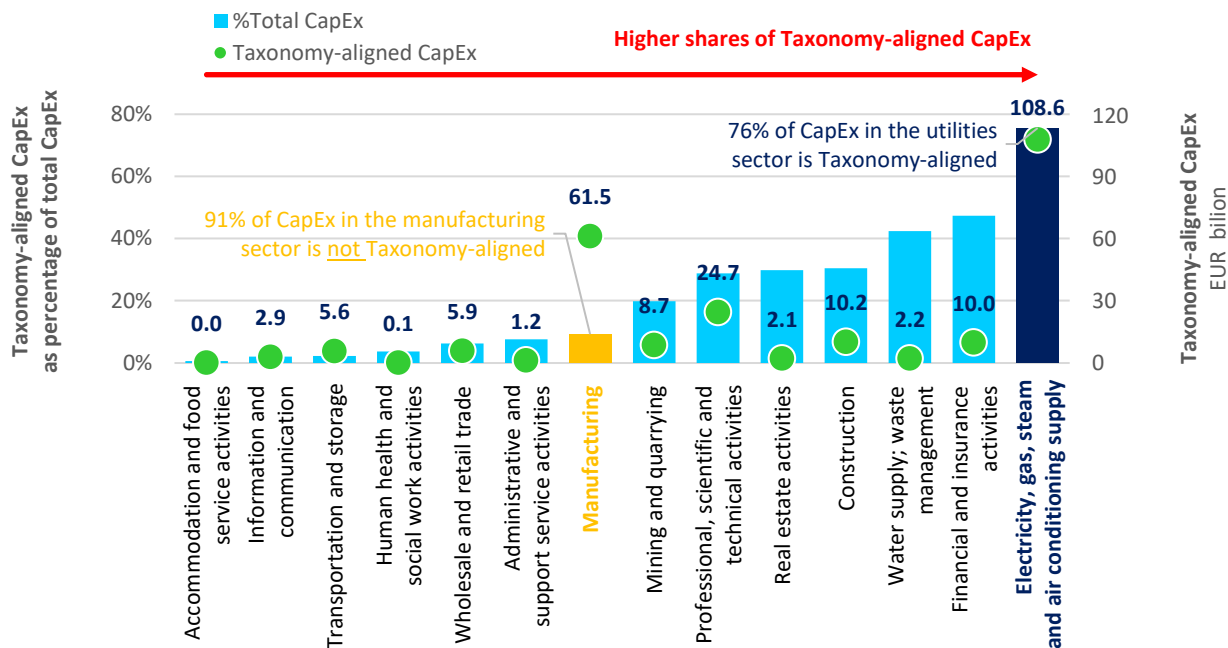
Note: Due to the reporting structure by data vendors, each company is defined based on its main activity. As a result, the Taxonomy-alignment of companies with part of their activities outside the Taxonomy may be attributed to the entity's main activity.

Sources: Bloomberg, Orbis. Note: Data as of October 2024.

Taxonomy-aligned investments are concentrated in a few key sectors

Beyond aggregate figures and general trends, the details of Taxonomy-reporting shine a light on the status of the green transition in key sectors. To date, Taxonomy-aligned investments are concentrated in a handful of sectors which are mature enough in their decarbonisation strategies to absorb green capital and implement their transition at speed and scale. In 2023, 44% of Taxonomy-aligned investments (EUR 109 billion) were made in the utilities sector (Figure 6). Three quarters of investments disclosed by 67 large utilities (electricity producers for the main part) are Taxonomy-aligned. Another quarter of Taxonomy-aligned investments (EUR 62 billion) is to be found among manufacturers. Given the size and diversity in activities of the manufacturing sector, the average level of Taxonomy alignment is low (9%) but concerns more than 530 European companies. Taxonomy-aligned investments in other aggregated sectors may account for sizeable shares of their total investments (e.g. real estate) but volumes are less consequential.

Figure 6. Taxonomy-aligned CapEx as share of total CapEx and corresponding volumes by NACE sector, 2023.



Note: The data scope is described in Box 1.

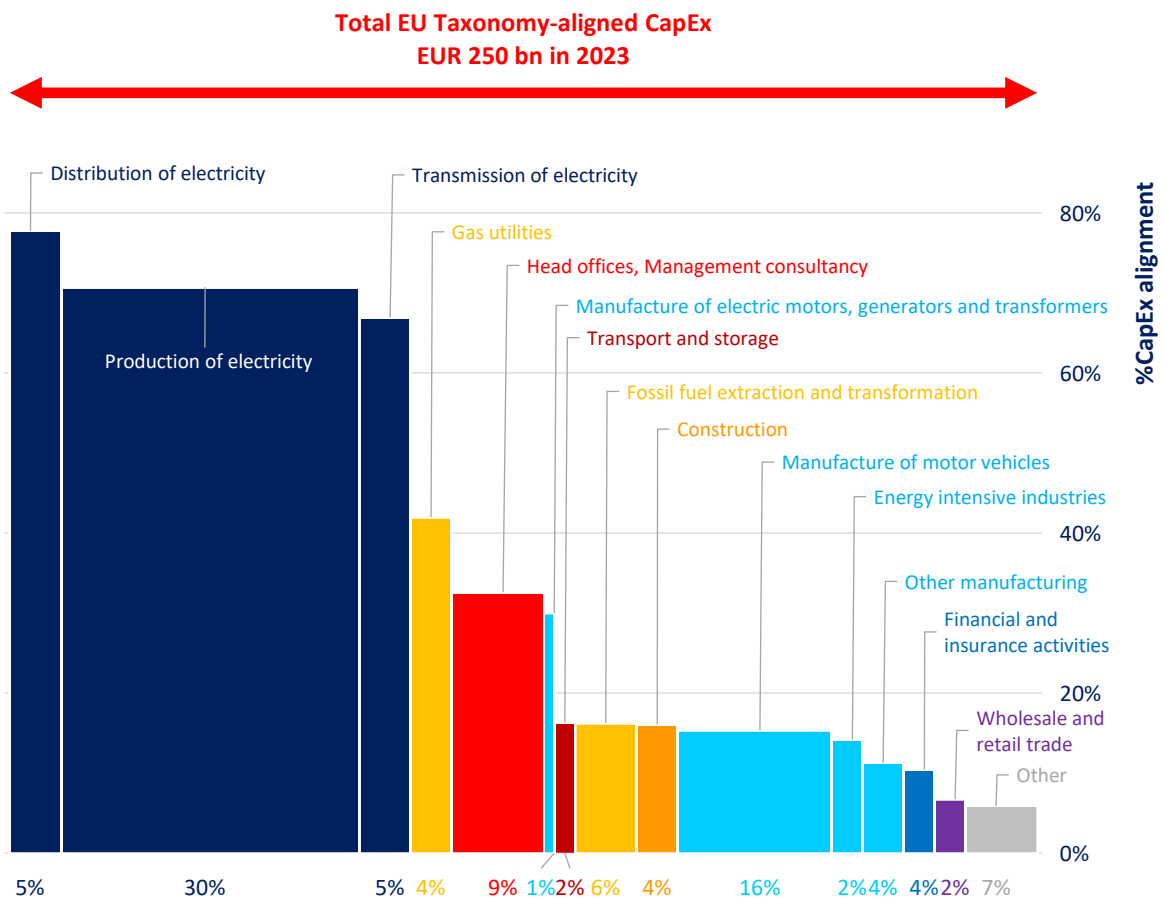
Sources: Bloomberg, Orbis. Note: 90% of investments (EUR 5 billion) made from *Public administration and defence, compulsory social security* (NACE classification O) companies are Taxonomy-aligned (not shown).

A more granular sectoral disaggregation provides further insights on the companies and sectors at the forefront of the transition (Figure 7). When separated from other utilities (gas distributors and district heating), electricity network operators and producers stand out as the main providers of Taxonomy-aligned investments in the European Union. Electricity production is the main vector of sustainable transformations in Europe, with 82% of investments declared as Taxonomy-eligible. Almost EUR 74 billion in CapEx was earmarked

as Taxonomy-aligned, translating into 71% share of alignment. Investments in power production are conducted jointly with power grid upgrades, including densification and expansion, which feature even higher degree of Taxonomy alignment.

As stated previously, the manufacturing sector and its diverse set of activities is the second largest source of Taxonomy-aligned investments. Car manufacturers are leading the pack within this group. They invested EUR 39 billion in sustainable activities in 2023 (16% of total Taxonomy-aligned CapEx), essentially supporting electrified vehicle sales in Europe. Despite their small amount, investments made by manufacturers of electric motors, a useful index of electrification and progress towards decarbonisation, reached EUR 1.3 billion. A trend to be confirmed in future monitoring iterations. The construction sector as well as some service-oriented companies also reported notable amounts of Taxonomy-aligned investments.

Figure 7. Detailed breakdown of Taxonomy-aligned CapEx by sector (horizontal axis); Percentage of Taxonomy-alignment (vertical axis), 2023



Notes: Entities from the financial services sector reporting on Taxonomy are mainly holding companies from utilities or manufacturers. Fossil fuel extraction and transformation is separated from other manufacturing activities. The percentage of Capex alignment is calculated as the share of Taxonomy-aligned to total CapEx.

Sources: Bloomberg, Orbis.

By contrast, the decarbonisation of transitional activities among energy intensive industries has not yet translated into material advances and sizeable shifts in investment patterns. The lack of long term commercially

viable alternatives to unsustainable ones in producing low-carbon products, such as green steel and green cement, prevent substantial investments in Taxonomy-eligible activities beyond business-as-usual capital allocation. Their Taxonomy-aligned CapEx represents altogether a percentage point of the EU total.

The Table 2 below provides a summary of key Taxonomy reporting metrics for 2023.

Table 2. Overview of Taxonomy-eligible and -aligned revenues and CapEx, 2023

	All reporting companies	Companies reporting non-zero values
	2,180 entities	667 entities
Taxonomy-eligible CapEx (EUR billion)	848	525
Taxonomy-aligned CapEx (EUR billion)	250	250
Average Taxonomy-eligible CapEx (%)	39	50
Average Taxonomy-aligned CapEx (%)	12.3	24
Taxonomy-eligible CapEx as share of total (%)	56	65
Taxonomy-aligned CapEx as share of total (%)	16	31
Taxonomy-aligned revenues (EUR billion)	764	761
Taxonomy-aligned revenues as share of total (%)	9	17
<i>Total CapEx</i>	<i>1,527</i>	<i>807</i>

Note: Total CapEx is derived from the percentage and volumes of eligible CapEx reported by each company and may differ from other financial documentation of the same companies due to inconsistent CapEx definitions (See Annex A1).

Sources: Bloomberg, Orbis.

A wider range of sectors report Taxonomy-aligned revenues

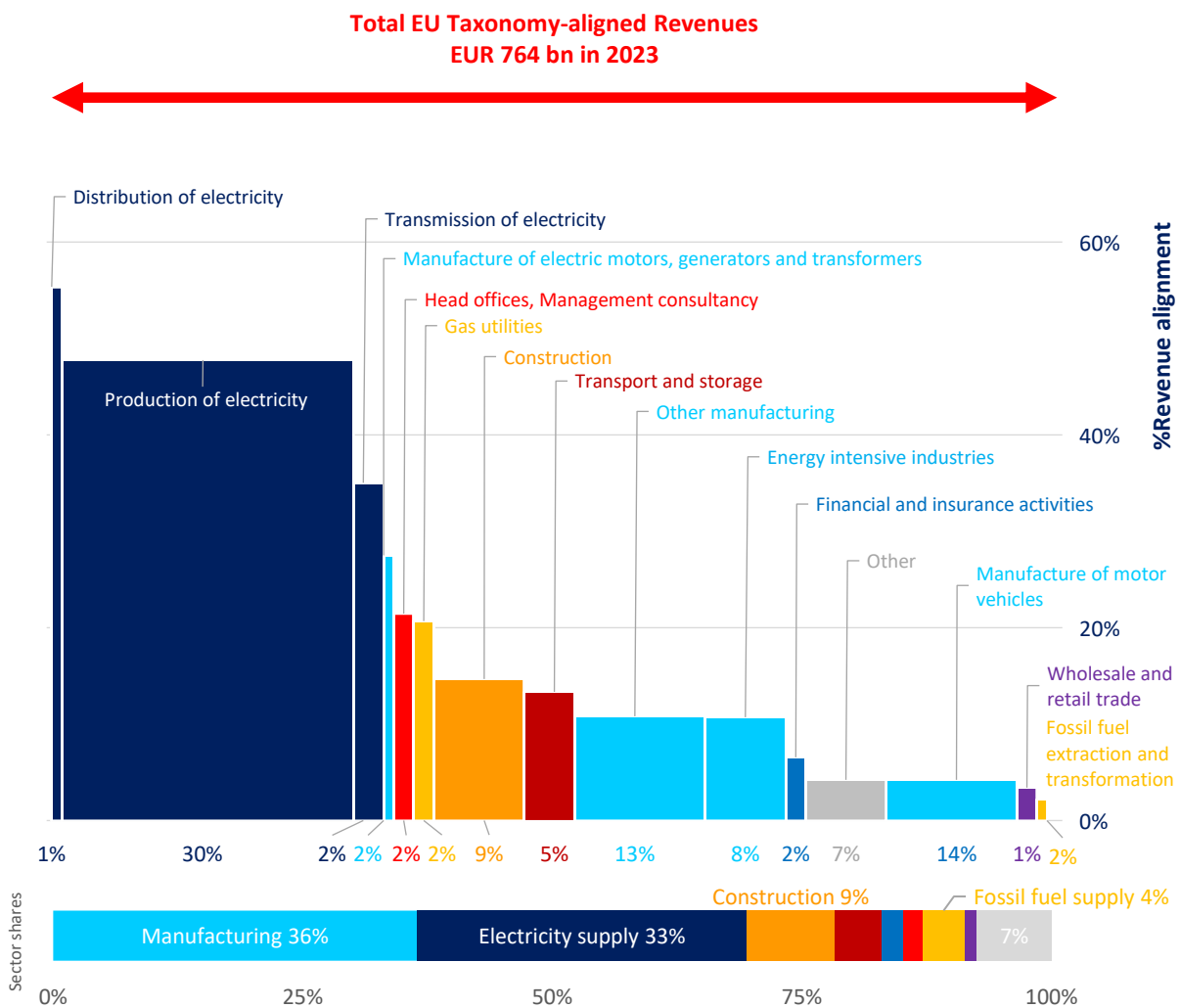
Taxonomy-aligned CapEx, a forward-looking indicator in nature, gives a good sense of corporate transformations and strategic reorientations. This metric gained prominence with the shift in focus from activities already deemed environmentally sustainable to transition measurement. Before the introduction of green CapEx through the Taxonomy, the revenue generated from green activities, a backward-looking indicator, was seen as the primary measure of a company's green finance credentials. Taxonomy-aligned revenue still offers useful and complementary insights on business accomplishments.

Between 2022 and 2023, Taxonomy-aligned revenues grew 25%, exceeding EUR 760 billion, three times the volume of Taxonomy-aligned CapEx reported by the same companies. The year-on-year growth is mainly driven by companies reporting higher levels of green revenues, as noted by Tylenda *et al.* (2023), before companies reporting revenues for the first time. Taxonomy-aligned revenues progressed slower than Taxonomy-aligned CapEx, which provides an encouraging perspective on the uptake of Taxonomy and points to increasing momentum behind the green transition.

About 70% of Taxonomy-aligned revenues were attributed to the power (EUR 287 billion) and manufacturing sectors (EUR 253) (Figure 8). However, the revenues within the manufacturing sector concerned a broader

base of activities. The transition engaged by car manufacturers several years ago now generates a consequential stream of Taxonomy-aligned revenues, EUR 118 billion in 2023, a 60% increase from the year prior. In addition, Taxonomy-aligned revenues disclosed by energy-intensive industries made up 8% of total revenues, distinctively higher than their shares of Taxonomy-aligned CapEx. Stricter emissions requirements, the anticipated reduction in free EU ETS allowances, the inception of the war in Ukraine and its consequences on energy prices, spurred heavy industries' investments in more efficient and low-carbon production processes in 2022 (EIB, 2024a).

Figure 8. Percentage of Taxonomy-aligned Revenues by sector (horizontal axis); percentage of Taxonomy-alignment in each sector (vertical axis) 2023



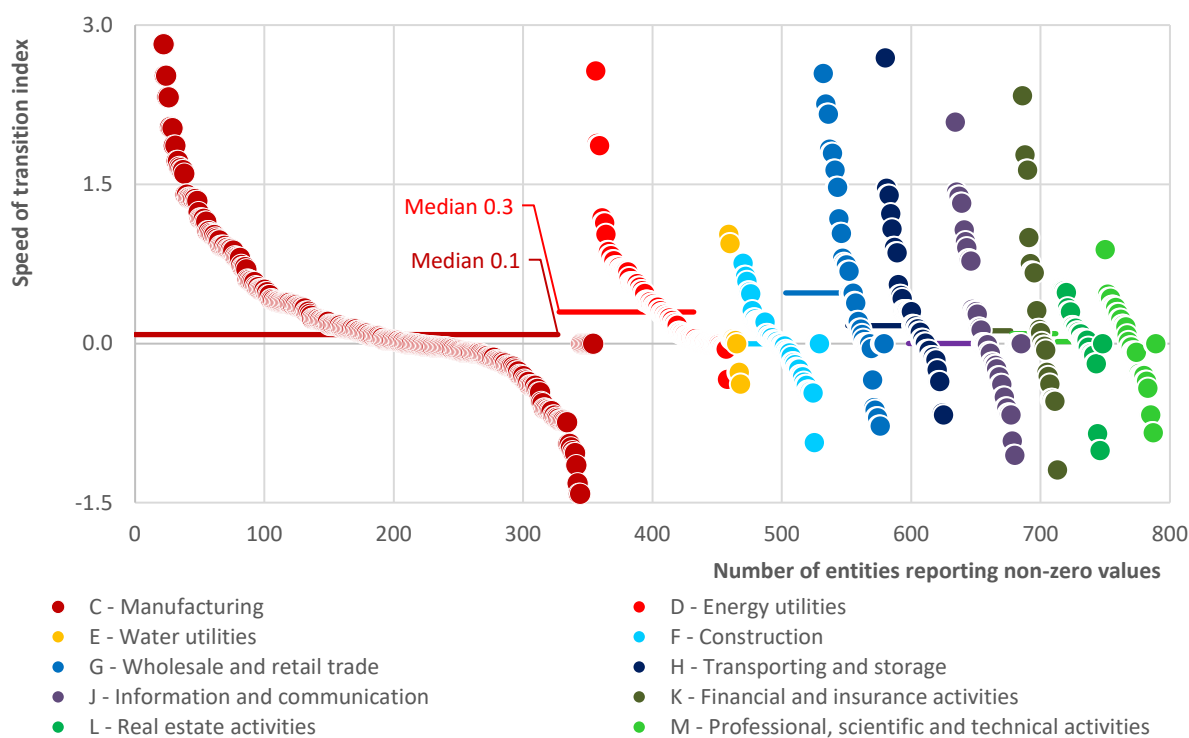
Note: Fossil fuel extraction and transformation is separated from other manufacturing activities.

Sources: Bloomberg, Orbis.

Measuring the speed of the climate transition through Taxonomy data

Taxonomy-aligned CapEx and Taxonomy-aligned revenues can be brought together to measure progress on the green transition.¹¹ Several metrics have been proposed, combining reported CapEx and revenues (e.g. Tylenda *et al.* 2024, Alessi *et al.* 2024).¹² This illustration builds on Alessi *et al.*'s approach to measure the speed of transition at entity and sector levels.

Figure 9. Measure of the speed of transition at entity level in selected NACE sectors, 2023.



Note: The index is defined as the natural logarithm of the share of green capex (Taxonomy-aligned as a percentage of total CapEx) divided by the share of green revenues (Taxonomy-aligned as a percentage of total revenues) (Alessi *et al.* 2024). Positive values signal a transition towards a low carbon economy whereby the size of the value signals the speed of the transition. Negative values signal a reluctance to transition. The index is built for all entities reporting non-zero values.

Sources: Bloomberg, Orbis.

The selected metric suggests that over 60% of the entities analysed (reporting on Taxonomy) have engaged on their transition journey, across all sectoral activities (Figure 9). However, a wide range of outcomes are

¹¹ The difference between Taxonomy-aligned CapEx and turnover was proposed and documented recently by investment banks as a simple metric to assess momentum around transition, giving further impetus to Taxonomy-related data on turnover. Larger Taxonomy-aligned CapEx than turnover, as seen in the case of power utilities and some manufacturing segments, may signal some readiness to accelerate sectoral transitions or a widening base of leading companies.

¹² Goldman Sachs's *Taxonomy Transition Index* (Tylenda *et al.*, 2024) compares absolute values of reported CapEx and revenues, taking the following thresholds into account: companies reporting Taxonomy-aligned Capex >20% higher than current aligned Revenue (which needs to be >0%); or sit within the top quintile on the delta (green Capex-green revenue) relative to peers, while having at least 5% aligned Capex and >0% on aligned revenue.

measured within and between sectors. These insights, however, may be apprehended with more confidence for the most represented sectors of the NFRD universe, i.e. the manufacturing sector and the power sector, which altogether account for over 430 entities. The power sector as a whole stands out as the leader in the green transition with 87% of indices (90 entities) above zero. With a slightly lower median value (0.1 against 0.3 in the power sector), the state of the transition within the manufacturing sector is a bit more contrasted. 60% of manufacturers reported larger proportions of Taxonomy-aligned CapEx than revenues. Retail companies and to a lower extent transport service companies also contain sizeable proportions of companies well engaged in their transitions.

This measure of transition solely rests on the comparison between Taxonomy-aligned CapEx and revenues and does not reflect the availability nor the credibility of each entity's transition plans. The next section is devoted to the assessment of the state of the transition beyond the Taxonomy framework.

Measuring corporate transition beyond green investments

Estimating investments supporting the transition

Starting point: Commission Recommendation on Transition Finance and Platform report on transition plans

The additional CapEx supporting the transition¹³ could either be CapEx into activities that *do no significant harm* (i.e. that meet the DNSH criteria of the Taxonomy), or CapEx plans that aim to improve the environmental performance of existing activities to such a no significant harm level. Such investments, if associated with a credible transition plan, are one of the examples of transition finance as per the 2023 Commission Recommendation on Transition Finance (EU Commission, 2023). Due to the lack of granular data on DNSH criteria, measuring transition investments with such precision is not feasible. Some investments might also fall outside the scope of the Taxonomy regulation (non-eligible activities).

Assessing the completeness of transition plans and derive investments supporting the transition

The analysis rests on the identification of companies with transition plans containing core elements of credibility, based on proxies, as defined in the Platform report on transition plans (EU PSF, 2025b). Four categories or tiers of companies are defined to identify the degree of maturity of a company's transition planning.¹⁴ The

¹³ Non-yet Taxonomy-aligned CapEx supporting the transition.

¹⁴ The details of the tier-based approach are provided in the methodological report. A similar system is used by members of various net zero alliances to measure companies' progress on transition. The scope of analysis is developed in Annex 1 of the Methodology.

transition plans of Tier 1 companies contain elements, through proxies, that may meet the minimum requirements for credible transition plans in terms of i) ambition ii) transparency/completeness and iii) feasibility.¹⁵ Tier 2 companies have set credible science-based targets but are lacking some of the core elements of credible transition plans. Tier 3 companies have set some emissions targets that, however, do not meet the criteria of science-based targets. The remaining Tier 4 companies fail to disclose any target or keep investing in expanding fossil fuel activities. Some details on the scope of analysis for companies in transition are summarised in Box 2.

Box 2: Scope of analysis for companies in transition

1063 companies operating within the European Economic Area were analysed, with 764 of them reporting under the NFRD and covering approximately 40% of NFRD universe. The breakdown of reporting companies by tier is as follows:

- Tier 1: 12% of companies in scope fulfilled the minimum requirements with elements of credible transition plans
- Tier 2: 21% of companies reported on and set 1.5°C midterm targets for scope 1, 2 and 3 emissions but failed to satisfy the minimum requirements for credible elements in their transition plans
- Tier 3: 45% of companies with targets on scope 1-2 emissions, albeit with ambitions misaligned with 1.5°C target.
- Tier 4: 21%, remaining companies.

Overview of transition plan categorisation

Transition tier	Targets	Emissions disclosures	Disclosure of a 1.5°C aligned transition plan	Disclosure and min. requirement for core elements	Financial planning as part of the transition plan	No fossil fuel CapEx
Tier 1 Elements of credible transition plans	At least a midterm scope 1, 2 and 3 science-based 1.5° target	Scope 1, 2 and 3 emission disclosure	Yes	At least 10 out of 14 indicators that could be mapped to the core elements of a credible transition plan	Yes	Zero
Tier 2 Science-based targets	Midterm scope 1, 2 and 3 science-based 1.5° target	Scope 1, 2 and 3 emission disclosure				Zero
Tier 3 Scope 1 and 2 targets	At least midterm scope 1, 2 target.	At least scope 1, 2 disclosure				Zero
Tier 4 Other within transition framework	Rest of companies in scope of the assessment					

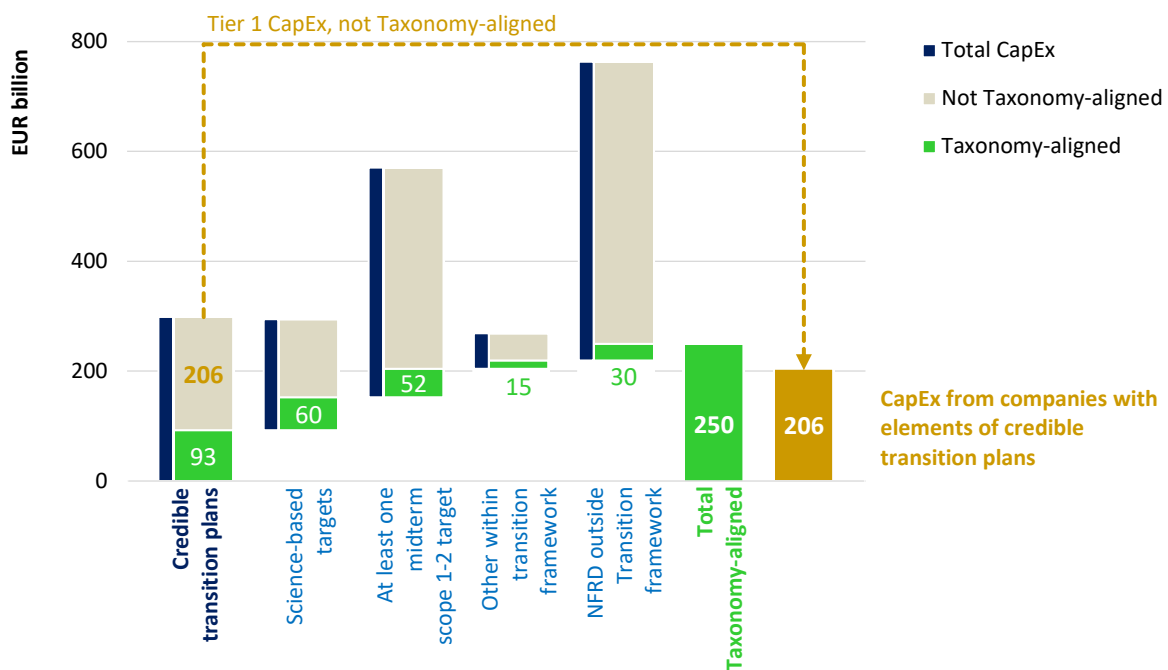
Notes: Each column correspond to core elements of corporate transition plans (EU PSF, 2025). When identified, companies with CapEx in fossil fuel operations are allocated to Tier 4, regardless of the presence of a transition plan or target.

¹⁵ No in-depth assessment of individual transition plans was conducted. Proxies are used to identify companies with transition plans containing some elements of credibility.

Additional CapEx supporting the transition: A primer

The monitoring framework seeks to identify investments beyond green investments, i.e. that are not Taxonomy-aligned. Such investments are defined as CapEx from Tier 1 companies that are not Taxonomy-aligned but may support progress towards emission reductions, provided that companies have transition plans with enough elements of credibility (through the use of proxies). In precise terms, this corresponds to the difference between total CapEx from Tier 1 companies and their Taxonomy-aligned CapEx. This gives rise to a total of EUR 206 billion invested by companies with elements of credible transition plans, complementing the EUR 93 billion invested by the same companies in Taxonomy-aligned activities (Figure 10). These investments identified as supporting the transition are thus significant, in the same order of magnitude as Taxonomy-aligned investments.

Figure 10. From Taxonomy-aligned CapEx to additional CapEx potentially supporting the transition, 2023



Note: Companies with elements of credible transition plans were identified through proxies.

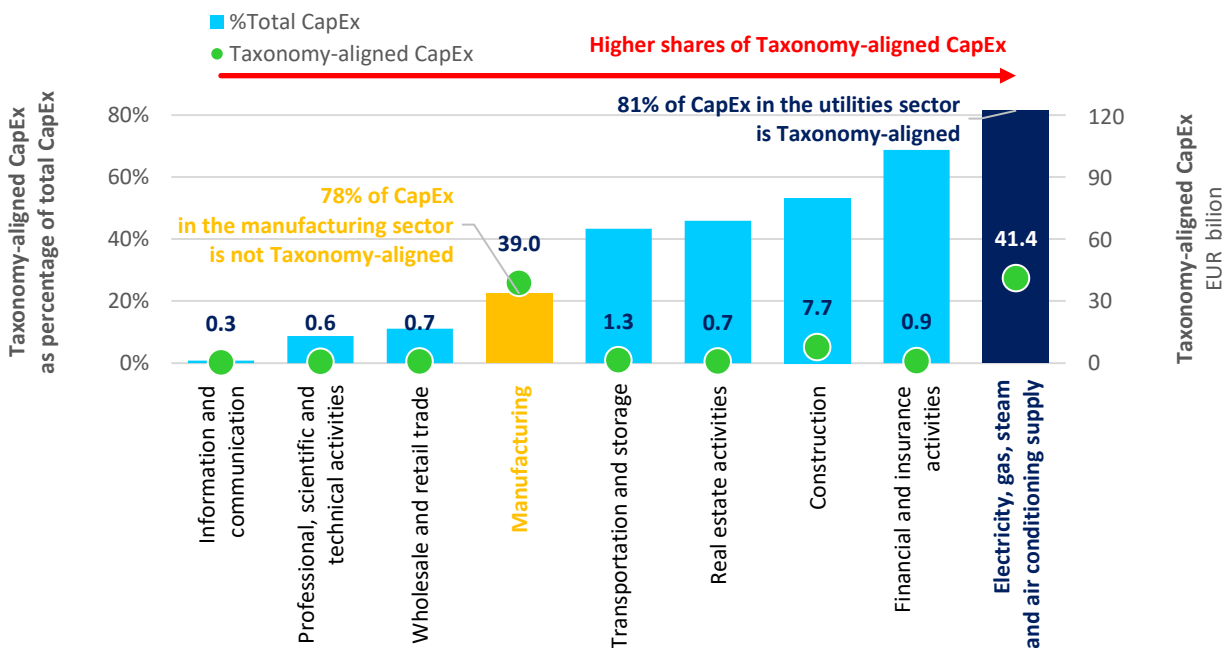
Sources: CDP, Orbis, Bloomberg.

Factoring transition plans into the monitoring framework now offers a new lens to look through and gauge advances on the transition path. Two cohorts of companies can be tracked more systematically: Companies with a majority of Taxonomy-aligned CapEx and other companies with a majority of non-Taxonomy-aligned CapEx, but with potential to support the transition, provided that their transition plans are credible enough. The relation between maturity of transition planning and the companies' emission performance is introduced in Box 3.

Sectoral breakdown of capital supporting the transition

The manufacturing sector appears instrumental for the transition, as highlighted by the sectoral breakdown of additional CapEx supporting the transition. In 2023, companies with elements of credible transition plans had already invested EUR 39 billion in green activities. But with 78% of CapEx not yet Taxonomy-aligned, the sector has a lot of room to scale up Taxonomy-aligned investments and contribute even more significantly to achieving Green Deal targets (Figure 11).

Figure 11. Taxonomy-aligned CapEx as share of total CapEx for companies with elements of credible transition plans, selected sectors, 2023



Note: Companies with elements of credible transition plans were identified through proxies.

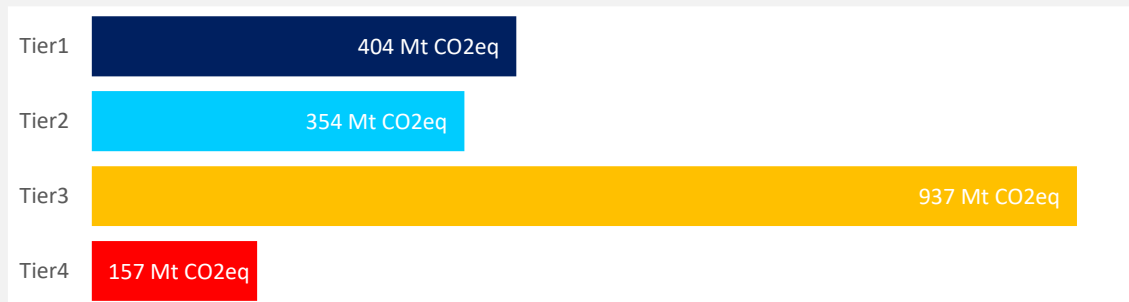
Sources: Bloomberg, Orbis, CDP.

The diversity of activities and contexts within the manufacturing sector, including the fact that the Taxonomy does not cover the full spectrum of manufacturing activities, may prevent reaching high levels of Taxonomy-alignment across the board. Some manufacturing segment sectors are more likely to progress and are the subject of the next subsection. Investments conducted by businesses with elements of credible transition plans in other sectors, including the construction sector, are less significant for the time being. They also offer vast potential for scaling up green investments. At the other end of the spectrum are power operators that already feature high levels of Taxonomy-alignment, with much less room to green up their investments. The transition in the power sector can thus be considered more advanced and mature than the manufacturing sector.

Box 3: Comparing transition categories in relation to emission performance

Can actual emission reductions be used to assess the credibility of transition plans? GHG emissions performance as part of CDP Net-Zero Alignment Dataset was used to evaluate if companies in different transition plan categories (Tiers) reduced their emissions at a different pace. Note, it does not cover scope 3 due to data limitations, which can represent more than 90% of emissions in many sectors (GHG Protocol Scope 3 FAQs).

Total scope 1, 2 emissions (Million tonnes CO₂ eq.)



Source: CDP

Two metrics were used. *First*, emission trends using past data (3 -5 years), to assess emission reductions. Out of the companies for which data is available¹, over 60% of companies in tiers 1 and 2 have, on average, negative emissions trends. For tier 3 companies, half of companies increased emissions, and for Tier 4 companies three quarters increased their emissions although less data is available to track the emission performance of those companies. The annualised emissions reduction rate for companies in Tier 1 and 2 is on average 2% respectively, while around 1% for Tier 3 companies and flat for Tier 4 companies.

Second, reported progress against targets. At least half of companies the in each tier (except from tier 4, which have not disclosed targets) are broadly in line or outperforming their targets with a 5-to-10-year time horizon. It is important to note that this analysis is irrespective of the ambition of the target. 34% of companies in tier 1 are underperforming their mid-term targets, which supports the assumption that an annual 2% reduction is not enough to be aligned to a 1.5°C trajectory. This number increases for Tier 2 companies, where ~38% of companies currently underperform their targets.

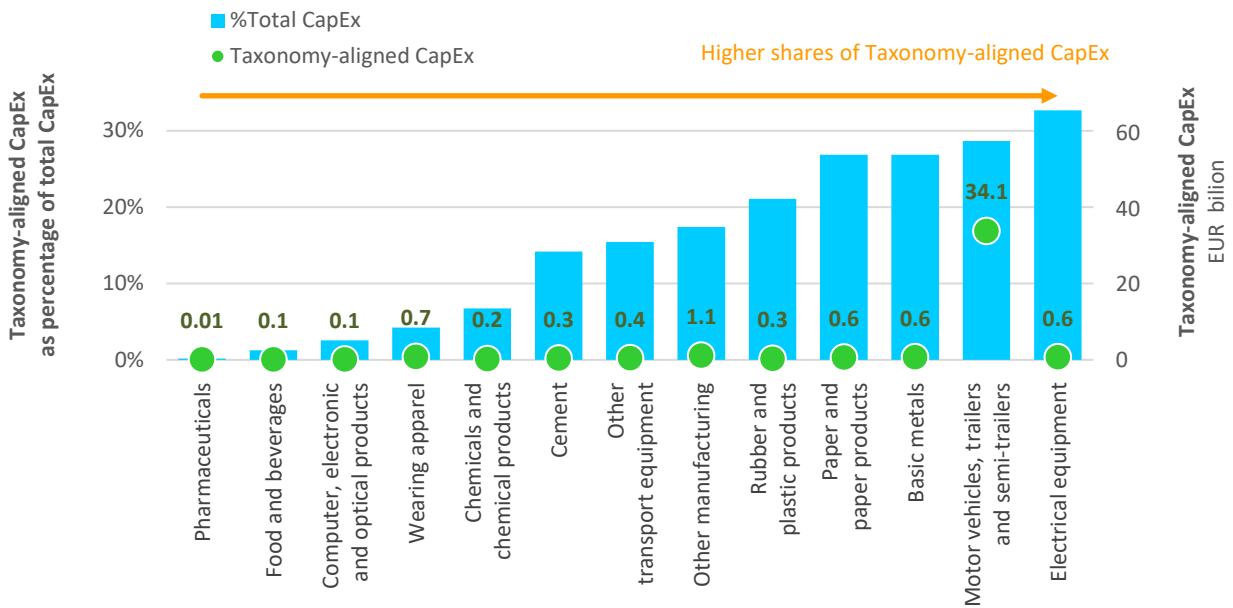
¹ A key limitation is data availability that reduces the scope of this analysis to cover only a subset of companies in the transition sample, as well as data quality. Out of ~1200 companies analysed for the transition categories, scope 1 and 2 emissions trends were constructed over at least 3 years for only ~430 companies (approx. 36%). There is a higher share of companies in tier 1 and 2 that reported sufficient scope 1 and 2 quality data to deduct trends over the past 3+ years. The availability of data reduces for tier 3 and 4.

Status of the transition in the manufacturing sector

Further sectoral decomposition of manufacturing activities, necessary to disentangle actual trends on transition, shows the prominence of carmakers. The supply chains underpinning transformation in personal mobility (Figure 12) account for almost 90% of Taxonomy-aligned investments in the manufacturing sector. These investments represent 29% of total CapEx in the sector. With the anticipated emergence of low-carbon

vehicles, boosted by EU regulatory obligations for carmakers, this share (and the corresponding volumes if invested) is poised to increase appreciably in the near term. Investments made in other sectors, when taken individually, are anecdotal, or not covered by the Taxonomy (e.g. food and beverages, paper and paper products, most basic metals).

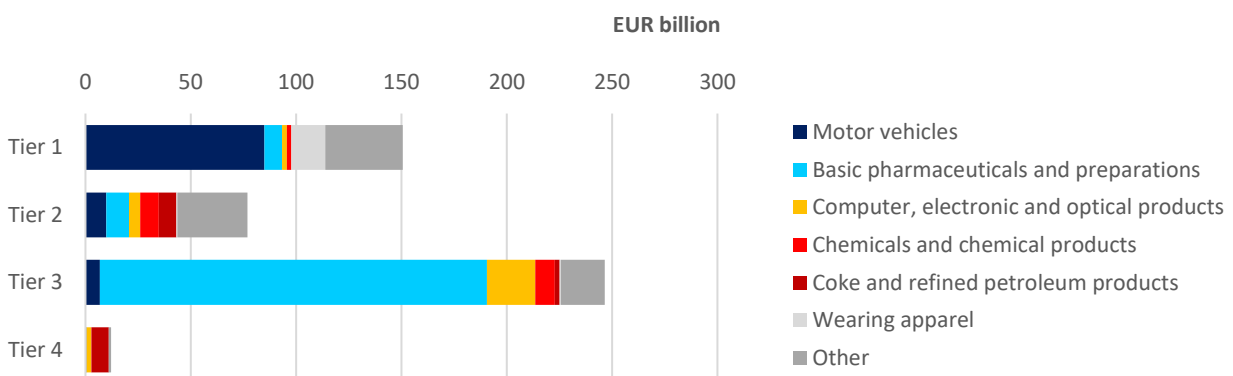
Figure 12. Taxonomy-aligned CapEx as share of total CapEx (left axis) and volumes (right axis) in the manufacturing sector, 2023.



Source: CDP, Orbis, Bloomberg.

Combining data on Taxonomy-aligned and non-aligned CapEx (including CapEx that is not be eligible) for companies with elements of credible transition plans (Tier 1), provides a more nuanced picture on the speed and scale of transition-related investments across sectors. More sectoral diversity is found in the composition of Tier 2 companies with science-based targets than Tier 3 companies with targets on scope 1 and 2 emissions, in which non-Taxonomy-aligned CapEx are dominated by pharmaceutical manufacturers (Figure 13).

Figure 13. Non-Taxonomy-aligned CapEx by tier in the manufacturing sector, 2023.



Source: CDP, Orbis, Bloomberg.

The limits of corporate debt capacity

Companies manage and optimise their resources through actively managing their capital structure, looking into debt financing and leverage capacity in capital markets. This capacity is limited and conditioned by its cost of funding, its impact on creditworthiness and possible alternative ways of financing, including the weighted cost of equity. As such, companies tend to prefer using debt financing to the extent that it remains optimal and attractive, without hurting its long-term profitability and business robustness. Also, the risk profile of economic sectors, as perceived by market participants, depend on factors such as sensitivity to economic cycles, profitability, capital intensity or competition. This leads to different optimal targeted capital structure (i.e. mix of debt and equity) across sectors. Finally, in absolute terms, a marginal equity increase has a multiplying effect on the capacity to take in more debt, while maintaining a similar ratio, thus underlying the importance of retaining earnings for the transition process.

Over the last decade, sectors broadly maintained a stable liabilities-over-total assets ratio over time (Figure 14). The ratio includes liabilities, including but not limited to short- and long-term debt, since other liabilities also limit a company's leveraging capacity. A lower liability-to-total assets ratio does not imply companies in a particular sector have spare capacity to leverage, but instead that a reduced ratio is their likely optimal capital structure. Therefore, one must firstly conclude that unless there is an accumulation of profits and/or new equity issued, leveraging capacity is limited and capped near observed absolute historical levels. Also, unless there is a structural change in the business model profitability and/or cost of capital, the observed percentage leverage levels tend to point to the upper and lower bounds within which companies and sectors operate.

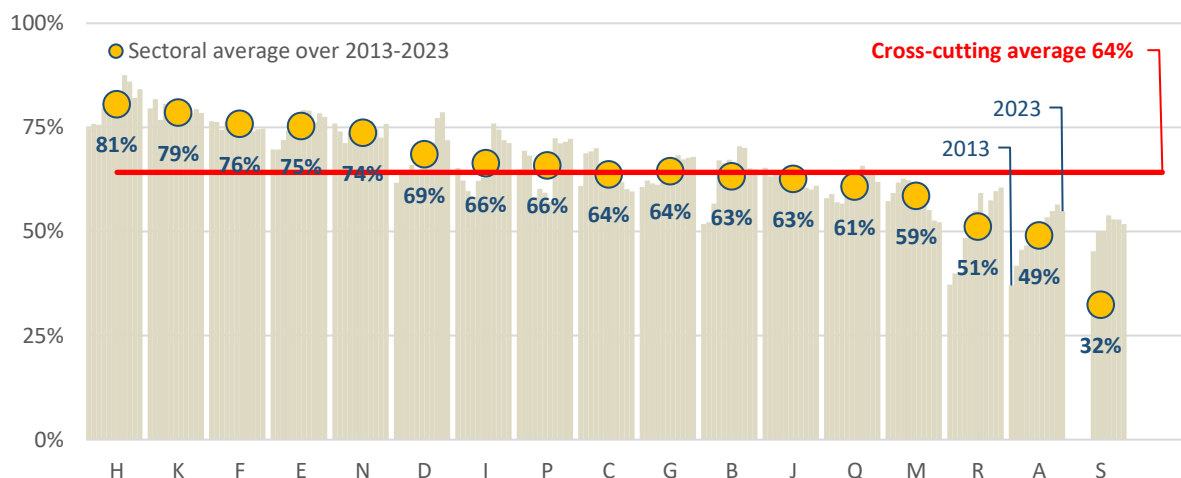
These limitations do not imply companies cannot make use of debt to finance the investment gap, as:

- There is room to substitute conventional debt for green debt while maintaining the same leverage ratios.
- If green financing is accessible at lower cost, the optimal capital structure point may allow for larger absolute debt financing.
- The higher profitability or lower risk profile of green or transition projects may justify a temporary leverage increase to either expand or reshape business models, allowing for a structural improvement in profitability and/or resilience to transition and physical risks over time.

Overall, in the sample universe comprising NFRD companies, the liabilities-over-total assets ratio ranges from 51.8% (Other service activities) to 84.2% (Transportation and storage). The manufacturing sector, energy utilities and transport and storage companies, the largest sectors size-wise respectively with EUR 6.9 trillion,

EUR 2 trillion and EUR 1.7 trillion in assets, feature liabilities over assets ratios of 59.7%, 72% and 84.2% (Figure 14).

Figure 14. Debt ratios by sector, 2013-2023



Note: NACE sector selection: A – Agriculture, Forestry and Fishing; B – Mining and quarrying; C – Manufacturing; D – Electricity, gas, steam and air conditioning supply; E – Water supply; Sewerage, waste management and remediation activities; F – Construction; G – Wholesale and retail trade repair Of motor vehicles and motorcycles; H – Transportation and storage; I – Accommodation and food service activities; J – Information and communication; K – Financial and insurance activities; L – Real estate activities; M – Professional, scientific and technical activities; N – Administrative and support service activities; P – Education; Q – Human health and social work activities; R – Arts, entertainment and recreation; S – Other service activities.

Sources: Bloomberg.

Historically, the largest differences between current liabilities-over-total assets ratio and maximum observed ratios concerned professional, scientific and technical activities, as well as the manufacturing sector. To reach the maximum ratio observed in 2016, the manufacturing sector could potentially add over EUR 716 billion in liabilities.

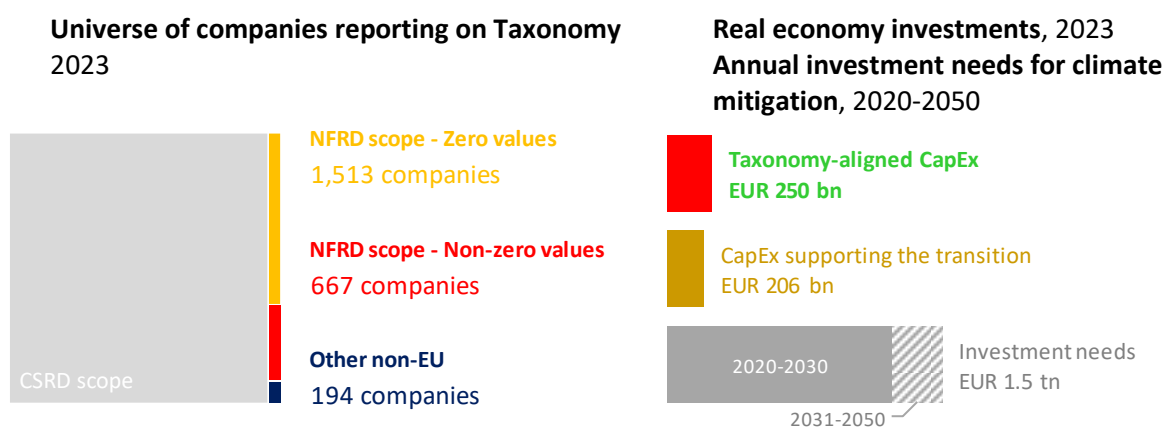
Assuming that the maximum liabilities-over-total asset ratio observed over the past decade is the upper limit in each sector, overall companies could at most boost their liabilities by EUR 1.07 trillion. This would be a one-off usage and would limit the capacity to absorb economic and financial shocks, while potentially not an optimal capital allocation in today’s interest rate environment, unless the cost of new green debt is lower than conventional debt. The observed utilised debt capacity across sectors hints that the investment gap cannot be closed solely based on debt issuance, despite playing an important role. A more thorough presentation of financing options for sustainable investments is given in the next chapter.

Round-up

The monitoring framework implemented in this document allows us to capture only a portion of corporate investments. Yet, sustainable investment data shows overall Taxonomy-aligned CapEx in 2023 was at EUR 250 billion, 50% of which was enabling CapEx and 11% was transitional CapEx. The rest was by and large low-

carbon CapEx (Figure 15). In a novel approach, the monitoring framework includes the measurement of credible corporate transition plans. Given that most CapEx supporting the transition was directed to eligible activities, this approach complements the consolidation of investments to sustainable activities. In 2023, companies with elements of credible transition plans (identified through proxies) invested EUR 206 billion on top of their Taxonomy-aligned CapEx (EUR 93 billion). The majority of these additional investments were made by power utilities and carmakers, the frontrunners of the green transition. Given their prominence in sustainability data and their enabling role for the green transition and the competitiveness of European supply chains, these two sectors are the subject of sectoral deep dives laid out in the next chapter. A dedicated sectoral use case includes a more extensive presentation of sustainable investments in these sectors as well as their main levers of financing.

Figure 15. State of play in the real economy



Note: Based on the assumption that about 50,000 companies may fall under CSRD scope. Investments needs limited to climate mitigation, here for the sake of illustration. Only a portion of CapEx supporting the transition may be factored in the Commission's assessments of future investment needs.

Sources: CDP, Orbis, Bloomberg.

The limited scope of companies reporting on Taxonomy (2,180 EU companies, 30% of which reporting non-zero investments) provides only a partial view of sustainable investments, even when combined with other datasets informing the status of the transition. Any conclusion regarding the distance to overall investment needs to 2030 and beyond should thus be approached cautiously. Future iterations of monitoring will give a better sense of progress against this reference point. Overall, the volume of green investments is insufficient and too limited in terms of sectoral destination.

Debt financing remains an essential tool for the transition. From a policy perspective, the absolute level of debt in a sector is of less relevance as other factors such as profitability, overall cash position and different optimal capital structure across different corporate sectors play an important role. Still, the portion of debt resulting from the overall optimal capital structure can be a limiting factor for transition financing, as high debt leverage ratios may impose a cap on the potential of significant increase in debt financing or at least

imply that alternative financing options are potentially more costly. However, access to debt financing among large companies does not seem to be a major issue, as the market remains open to absorb higher levels. Instead, it highlights the importance of policy predictability – particularly in capital-intensive sectors related to large infrastructure transformations. (Draghi, 2024; Pisani-Ferry and Tagliapietra, 2024).¹⁶

This monitoring framework of sustainable investments, although incomplete, can be an effective tool to inform and guide the European decarbonisation strategy in relation to sectoral pathways. Understanding the state of play on investments supporting the transition, as well as underserved activities, sectors and environmental objectives combined with how sectors can finance their transition will, if used well, support better long-term policy predictability.

¹⁶ Transitioning to green production processes involves significant upfront costs and may induce temporary disruptions: Substantial reallocations of capital and labour towards greener activities may affect productivity negatively in the near term. In the medium to long term, an orderly transition path, resting on a gradual and predictable increase in policy stringency, is more likely to affect labour productivity positively and reduce stranded asset risks (ECB, 2024). A suite of instruments is available for policymakers to boost green innovation (Blanchard et al., 2023) and alleviate the short-term impact of factor reallocation on productivity.

The state of play in the financial sector

Is there enough financing for the transition?

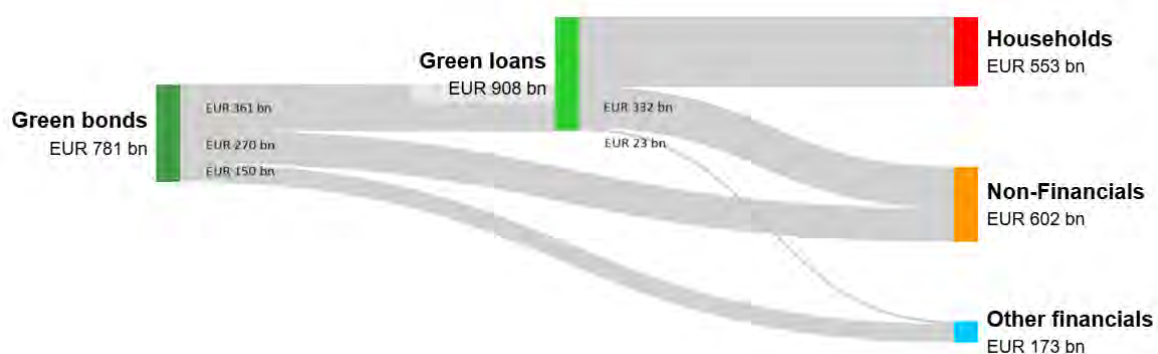
Regulated sustainability data from the financial sector has only recently become available, primarily through the SFDR and Pillar 3 reporting, alongside a vast array of non-regulated sustainability information. This chapter provides an overview of the financial sector's role in the transition, considering both primary and secondary market perspectives.

Primary markets

The green debt financing landscape

The estimated *stock* of green financing volumes outstanding in the EU through primary markets instruments (green loans and green bonds) amounted to EUR 1.69 trillion as of the end of 2023. The banking sector estimates are likely to be an under-estimation as these are based on a sample of 119 large EU banks (see next sub-section).¹⁷ On the other hand, banks package green loans to seek external financing in the form of green bond issuance, which leads to a natural double counting of some of the outstanding volumes. The estimated stock of green financing channelled to non-financial corporations and households (i.e. excluding financial sector borrowers and issuers) amounted to EUR 1.15 trillion (Figure 16).

Figure 16. Overview of EU green debt financing landscape through key primary markets instruments; total outstanding as of end 2023.¹⁸



Note: The diagram depicts the total value of green debt finance instruments outstanding (stock) in the EU by instrument type. The outstanding *Green Bonds* are split by issuer sector (Non-financials, Banks, Other financials). The outstanding green *Bank loans* are

¹⁷ For reference, banks' total loan financing amounted to almost triple that of total bond financing for euro-area NFCs in 2022 (ECB, 2023).

¹⁸ Green loans to counterparties other than Households, Non-Financials, Other Financials amounted to EUR 54 billion but is not included for consistency reasons. This would include e.g. lending to local governments.

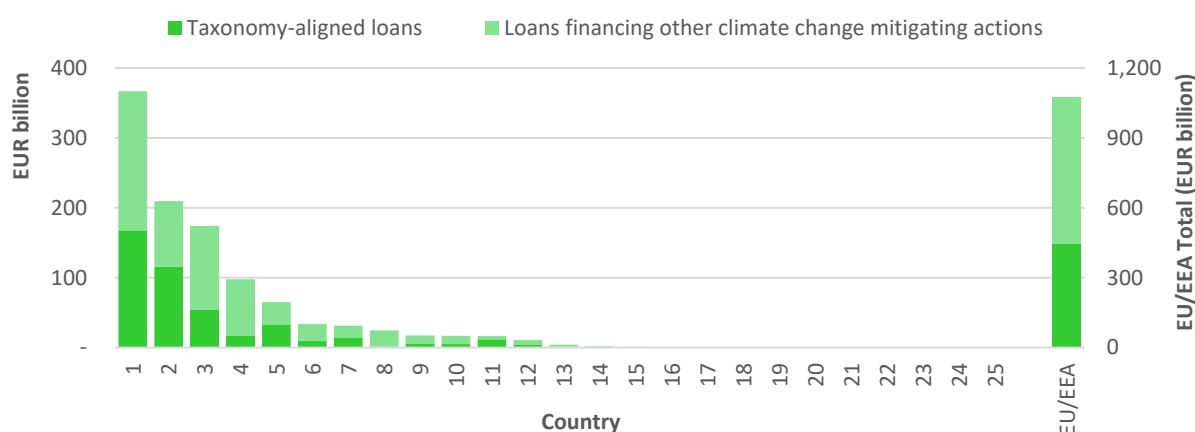
split by borrower sector (Non-financials, Other financials, Households) and cover loans that are Taxonomy-aligned and not Taxonomy-aligned. Non-Taxonomy aligned loans by banks to Non-Financial Corporates included Sustainability Linked Loans.

Sources: ECB, EBA, ESMA, Refinitiv Eikon.

Green loans are divided fairly evenly across Taxonomy-aligned loans and other green loans^{19,20}

The total value of Taxonomy-aligned loans amounted to EUR 443.3 billion as of Q2 2024 (Figure 17). The vast majority of this was disbursed in the form of household loans (EUR 387.9 billion), particularly driven by mortgage loans (EUR 377.7 billion). Building renovation loans on EU banks’ books amounted to EUR 0.5 billion. The total value of reported Taxonomy-aligned loans to non-financial corporations amounted to EUR 51.4 billion.²¹

Figure 17. EU banks' Taxonomy-aligned lending and lending to other climate change mitigating activities sorted by EU country, Q2 2024



Note: Countries are ranked by total lending volumes in the two segments. The number of banks included vary substantially across countries. Banks’ exposures that are not Taxonomy-aligned as referred to in Regulation (EU) 2020/852 but that still support counterparties in the transition and adaptation process for the objectives of climate change mitigation. Loans issued under standards other than the Union standards, including green loans, sustainability-linked loans that are linked to aspects on climate change.

Source: Data collected by the EBA on Commission Implementing Regulation 2022/2453 Templates 7 and 10.

The concentration of Taxonomy-aligned loans in only a few countries may partially be explained by the concentration of large pan-European banks being headquartered in the largest economies.

¹⁹ Indicators and data in this section is based on latest ESG Pillar 3 loan stock disclosures data collected by the EBA for the first time in June 2024 (reference data Q4 2023) and again in December 2024 (reference data Q2 2024). Data from ~ 120 banks was able to be used from the second collection round, providing a decent coverage of EEA banking sector assets: The sample covers over 90% of FINREP reporting banks (in terms of assets), as well as some other banks. Data revisions are still expected as the analysis of data quality is on-going. Collection of Pillar 3 data by the EBA will for the time being continue on a semi-annual basis until an ESG framework to collect this prudential data is fully implemented. Looking ahead, flow data on bank loans could be derived from year-on-year changes in Pillar 3 (stock-based) disclosures. The EBA also plans to publish selected indicators based on its P3 data collection.

²⁰ Data quality issues exist for the time being given the recent nature of these disclosure obligations. This can include lack of disclosed data on certain sub-categories by some banks. See the joint *Methodological Report* for more background on this.

²¹ The relatively small share of taxonomy-aligned loans to non-financial corporates (EUR 52.7 bn) is likely at least partially explained by the fact that data covers only NFCs subject to the NFRD. In addition, banks might find it easier to assess Taxonomy-alignment for household thanks to more routine types of Taxonomy assessment compared with corporates.

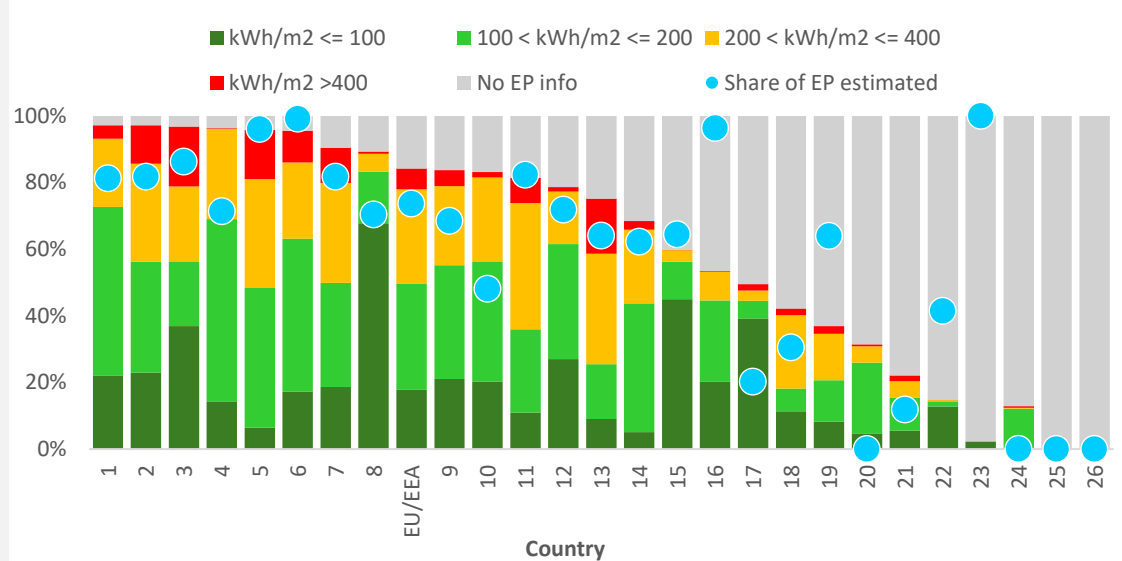
Green Asset Ratios (GARs) for EU banks' loan portfolios take a broader perspective on Taxonomy-aligned exposures on banks' balance sheet. They can inform to what extent lending originating within the EU is going into Taxonomy-aligned activities (See next chapter, section dedicated to regional imbalances *Towards a green Savings & Investment Union*).

Box 3. Real estate lending and energy performance

Enhancing the energy performance of buildings is a core objective of the European Green Deal, guided by directives such as the Energy Efficiency Directive and the Energy Performance of Buildings Directive. Financing the renovation of buildings will play a substantial part in this.^(*) The energy performance of banks' existing commercial and residential immovable property collateral can provide insights into the existing bank financing of the EU building sector from an energy efficiency perspective and an indirect proxy of the overall property in the EU.

A significant share of loans collateralised by immovable property in the EU are reported in the higher performing buckets of energy efficiency.^(**) At the EU aggregate level, approximately 50% of reported exposures with energy performance data exceed 200 kWh/m². Properties with energy consumption above 100 kWh/m² will need to improve over time. Therefore, only those in the dark green category can be considered as having potentially sufficient energy efficiency.

EU banks' lending collateralised by residential and commercial immovable property to the EU (Q2 2024)



Note: Each number represents a country. Countries are sorted by the share of exposures for which energy performance information is provided. Source: Data collected by the EBA on Commission Implementing Regulation 2022/2453 Template 2.

(*) Reporting lending figures on this (EUR 0.5 bn, see above) are low but this is possibly also partially driven by a lack of data in the reported templates on some of the sub-categories, including building renovation loans.

(**) EBA Pillar 3 data on the energy performance of banks' real estate portfolios remains exploratory and incomplete to-date. Energy performance is not provided for the whole mortgage book in most cases, and a large share (in many cases above 70 %) of the energy performance information is based on estimates. Caution is hence warranted when interpreting the energy performance of EU banks' lending collateralised by residential and commercial real estate.

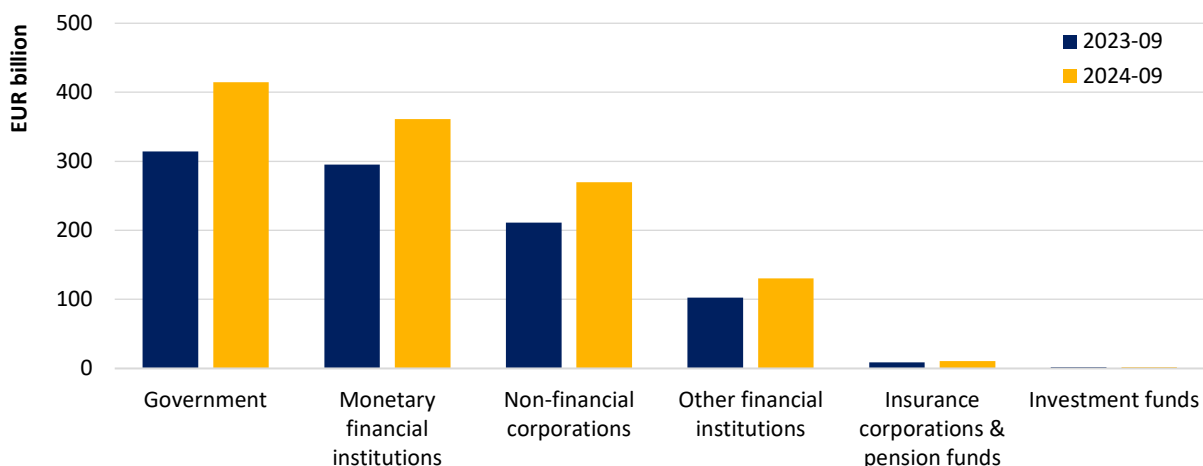
The total value of loans that are not Taxonomy-aligned but still support counterparties in the transition and adjustment process for climate change mitigation objectives reached EUR 629.6 billion, or about 5 % of total lending.^{22,23} At EUR 339.8 billion, non-financial corporate loans account for the majority of this part of the lending books. Loans to households amounted to EUR 209.6 billion, of which more than 80 % is collateralised by residential real estate. Approximately EUR 10 billion is in the form of lending for building renovations. Figures vary widely across banks. Loans funding climate change mitigation activities issued under standards other than the bloc's, provide an indication of banks' wider green lending, although banks may use different definitions of green lending.

Green lending volumes, Taxonomy-aligned lending and other potential green lending together with decarbonisation targets such as those set by members of the Net Zero Banking Alliance (see Box 4) highlight the gradual transition of banking sector assets in line with the Platform's recommendations.

Public entities and financial institutions dominate the green bond market

The total outstanding amount of market-qualified green bonds (with Second-Party Opinion) issued by EU-27 domiciled entities reached EUR 1.2 trillion in Q3 2024. This includes EUR 502 billion from financial sector issuers (of which EUR 361 billion comes from monetary financial institutions) and EUR 270 billion from non-financial corporate issuers (Figure 18).

Figure 18. Total value of EU-27 green bonds outstanding with Second-Party Opinion by sector (outstanding amounts at face value)



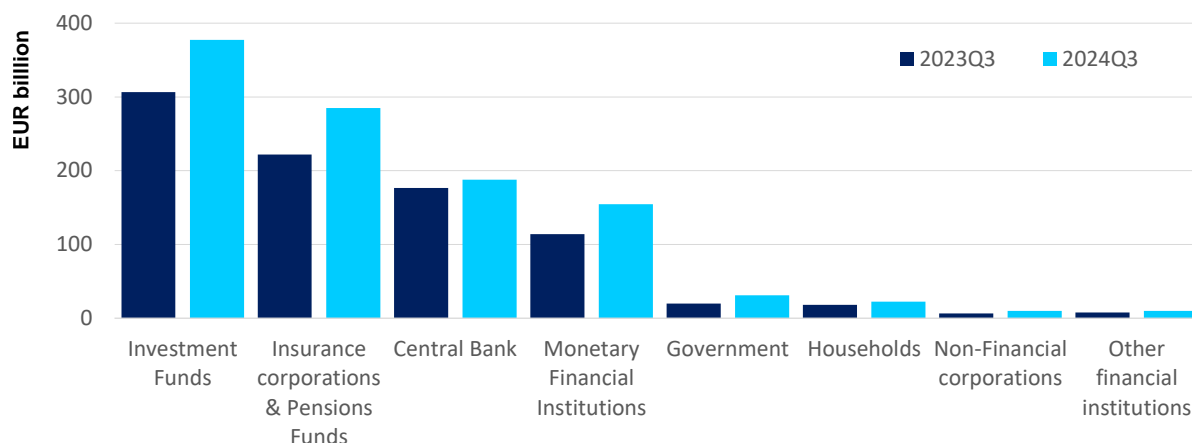
Sources: ECB - Centralised Securities Database (CSDB).

²² This share should not be directly compared to the total loan GAR since denominators are different.

²³ A first set of the indicators presented in *Methodological Annex 3* has been established using Pillar 3 (P3) data as of Q4 2023 collected for the first time by the EBA in June 2024. The rest of the indicators will become available as part of future data collections with varying first disclosure date requirements for the different indicators.

In the euro area, the main holders of green bonds (with SPO) are investment funds (EUR 377 billion) followed by insurance corporations and pension funds (EUR 285 billion), central banks EUR (188 billion) and monetary financial institutions (EUR 155 billion) (Figure 19).

Figure 19. Euro area holdings of green debt securities with Second-Party Opinion by sector (outstanding amounts at face value)



Note: *Other financial institutions* include Other financial intermediaries, except insurance corporations and pension funds; Financial auxiliaries; and Captive financial institutions and money lenders. This category may include financial subsidiaries of non-financial corporations in charge of issuing debt for the parent group.

Sources: ECB – CSDB and Securities Holdings Statistics.

Green bond flows: A European success story

Growing private sector share in green bond issuance

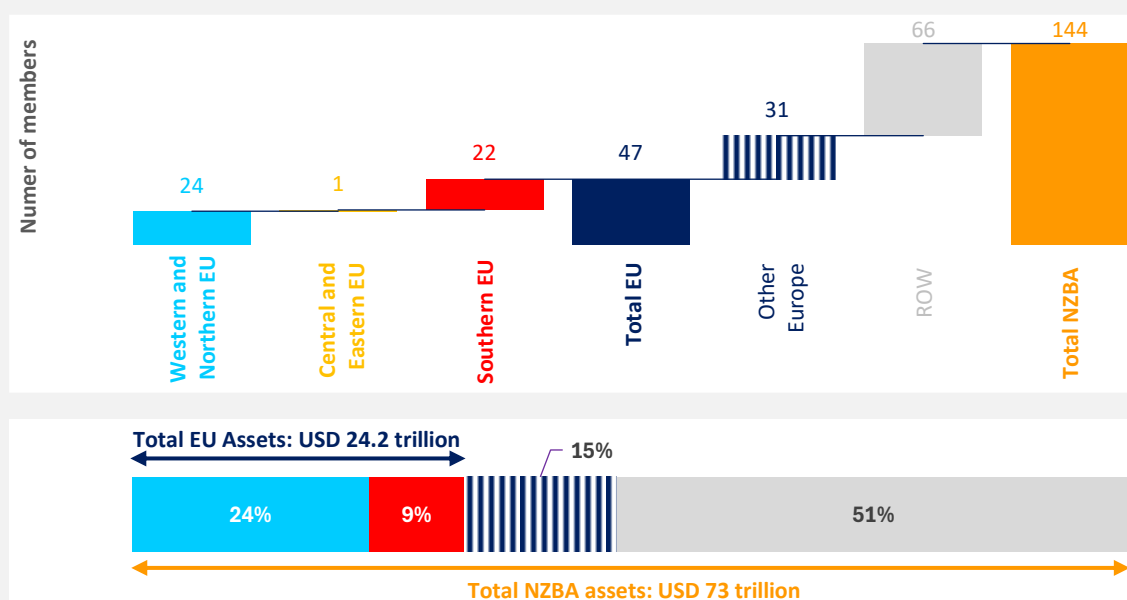
Unlike the previous section, which focuses on *capital stock*, this section analyses the primary market *capital flows*. Bonds are a major funding source for European companies, financial institutions, and public entities. The issuance of ESG bonds – such as green, social, and sustainability-linked bonds (SLBs) – has significantly grown over the past years, driven by corporate interest in green projects and increasing investor demand for ESG investments (Figure 20).

The Platform's analysis firstly focuses on green bonds, which fund projects with environmental goals, and which are not necessarily Taxonomy-aligned. The shortcomings of available data do not allow us to determine whether issued bonds are refinancing existing debt or financing new investments. This section concentrates on the issuance of new bonds, which provides a more precise view of market trends compared to outstanding amounts.

Box 4. Net Zero Banking Alliance

Around half of the Net Zero Banking Alliance (NZBA) members and assets are in Europe, with a third of members in the EU and total assets of NZBA EU members accounting for around 70% of total EU banking sector assets according to ECB data (NZBA, 2024). Signatories commit to aligning portfolios with pathways that limit global warming to 1.5°C above pre-industrial averages with low/no overshoot, setting decarbonisation targets¹ with focus on 9 predefined sectors with significant climate impact. Member banks commit to setting some decarbonisation targets within 18 months of joining, and a full set of targets within 3 years. Targets shall cover lending, investment portfolios and, from November 2025, debt and equity capital markets activities. Members also commit to developing a transition plan within a year of setting targets, demonstrating how they plan to achieve them. Over half of NZBA members in Europe have published a transition plan, and a further quarter intended to publish one in 2024² (NZBA, 2024).

Net Zero Banking Alliance Membership and assets under management, 2024



Source: Net Zero Banking Alliance. Note: Other European NZBA members outside the EU: UK (11); Türkiye (6); Switzerland (5); Norway (3); Liechtenstein (3); Iceland (2); Russia (1).

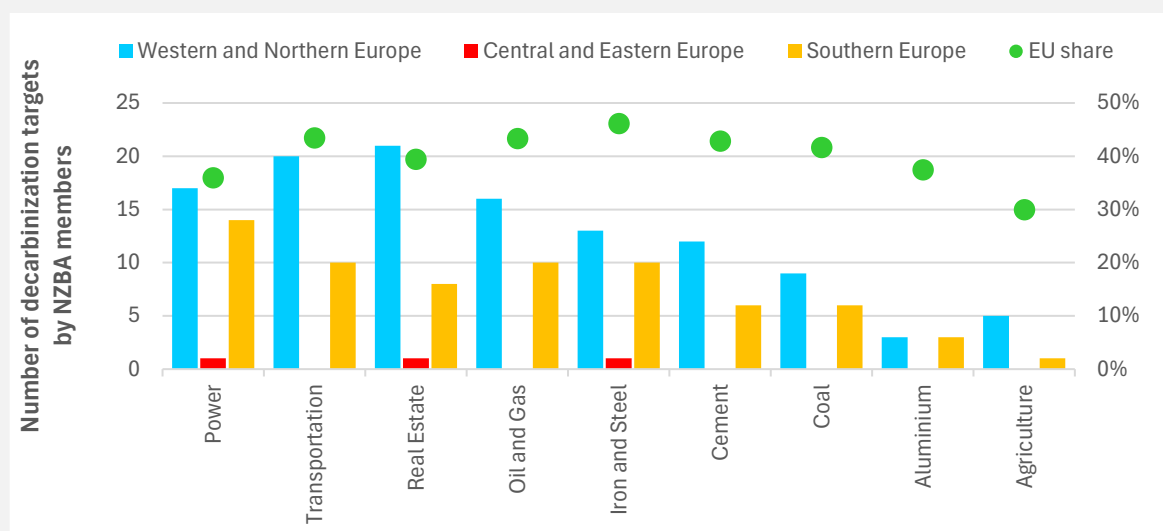
Looking at decarbonisation progress across the nine key sectors covered, most NZBA members have set targets for power generation, transportation and real estate³. Power generation is the sector for which the most decarbonisation targets have been set with 71% of members overall having set a power generation decarbonisation target. This figure is 66% for Europe, including 88% of members in Southern Europe and 71% of members in Western & Northern Europe. The average reduction targeted for 2030 is the same for NZBA members overall and for European members at 53%. Targeted reductions are slightly lower for Western & Northern Europe (52%) and Southern Europe (47%). Half of NZBA members have set decarbonisation targets for oil and gas with proportions higher for Southern Europe (63%) and Western & Northern Europe (67%). The ambition of targets was greater for Western & Northern Europe (targeted average 46% reduction for 2030) than it was for Southern European members (average 26% targeted reduction)⁴ (NZBA,2024).

Box 4. Net Zero Banking Alliance (continued)

Real Estate is a challenging sector due to the number of individual clients, poor data quality and a policy environment that does not require new buildings to be of high environmental standards (impacting the flow of new assets) or incentivise decarbonisation action by building owners (impacting the stock of assets) in every jurisdiction. Half of NZBA members overall have set decarbonisation targets for real estate (either commercial or residential or both). Real Estate targets have been set by a much greater proportion of Western & Northern European members (75%) than Southern European members (31%). Average targeted reductions for 2030 are reasonably comparable across European regions at around 50% (NZBA,2024).

Half of NZBA members have set a transportation target covering at least one sub-sector out of aviation, shipping and autos. This figure was higher for the European region at 59% with Western & Northern Europe very high at 83% and Southern Europe at 63% (NZBA,2024).

Number of decarbonisation targets set by NZBA members for priority sectors (2024)



Notes: Share of NZBA total referring to total NZBA sectoral targets set. Banks should elaborate a transition plan as part of their NZBA commitment, but the Platform does not have any opinion on their credibility.

Source: Net Zero Banking Alliance.

¹ The framework outlined in the Guidelines for Climate Target Setting for Banks V2 (see <https://www.unepfi.org/net-zero-banking/resources/>) details that decarbonisation targets should be emissions based and can be based on absolute emissions or emissions intensity reductions with intermediate targets required for 2030 or sooner.

² Banks have discretion on how they approach meeting those targets. Strategies commonly employed involve client engagement to evaluate client transition plans, setting targets for green or sustainable financing, engaging on the policy levers that will assist clients' investment in decarbonisation, and developing internal strategies, policies and processes.

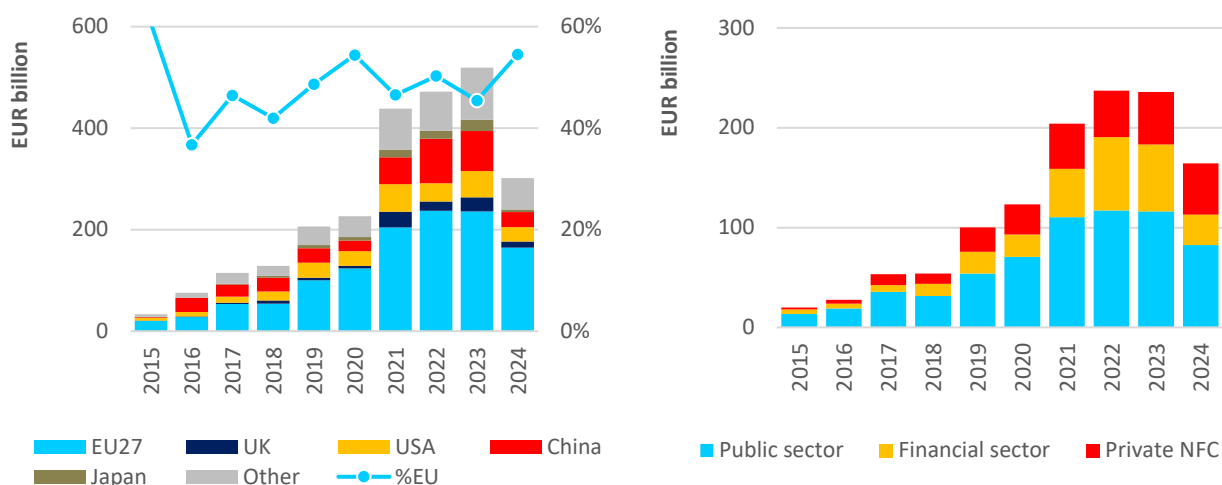
³ As members have joined the Alliance throughout the last 3.5 years, they are at different stages of their climate mitigation journey. The figures on targets do not indicate the degree of compliance with the Guidelines for target setting, but rather represent the overall progress made. Data is based on 122 survey responses from NZBA members and is as of end-May 2024.

⁴ Targeted reductions are a simple average of banks' targets and are not weighted for size of bank or exposure. Some targets may be based on absolute emissions, whereas others are based on a carbon intensity reduction.

The EU-27 is the global leader in green bond issuance, topping the USA and China as the largest issuing region for the last 10 years and representing more than half of the market in the first half of 2024 (Figure 20). The growing trend displayed from 2015 onwards brought the green bond share in EU27 to 11% of the total bond market²⁴ in 2023, corresponding to EUR 235.8 billion.

The public sector²⁵ is the largest issuer of green bonds among EU countries (Figure 21), followed by financial sector actors. Non-financial corporates have lagged behind but issuance picked-up in 2024. The share of private sector issuance (both from private NFCs and from financial corporations) has been increasing in the last decade, from 32% of new issuances in 2015 to 51% at the end of 2023, reflecting the rising appetite of the private sector to mobilise green finance.

Figure 20. Global issuance of green bond by global regions and countries (left panel) and by issuer type in the EU (right panel), 2015-2024.



Source: Dealogic DCM. Note: First semester 2024 only.

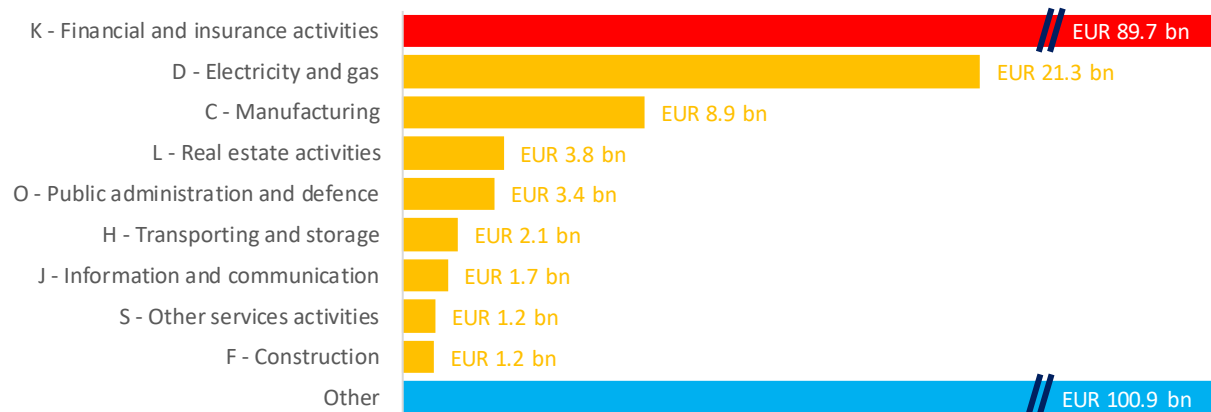
The financial sector is the largest issuer sector after excluding public entities (such as state/provincial authorities, local authorities, and central governments), with EUR 90 billion of green bonds issued in 2023. This is consistent with banks issuing green bonds to finance green projects in the real economy (both to households and to companies). The second largest issuer sector is the Electricity and Utilities sector at EUR 21.3 billion in 2023, where green bonds have been financing many new renewable energy projects, even if the investment gap remains substantial. Manufacturing comes third, at EUR 8.9 billion, of which EUR 4.1 billion comes from

²⁴ Total bond market considers the Dealogic DCM universe, see the methodological annex for a clarification of what is included in the database.

²⁵ Public sector is defined from Dealogic DCM company type, and in general refers to all entities related to stata/regional authorities. Consult the Methodology for more information on sectoral attribution.

the manufacturing of motor vehicles (see *Use case* chapter for an in-depth analysis). It is also worth mentioning the EUR 3.8 billion issued by the Real Estate sector, which is another crucial sector for the transition objectives and a key sector to reach the buildings' energy efficiency goals in the context of the European Green Deal.

Figure 21. Issuance of green bonds in the European Union by NACE section, 2023



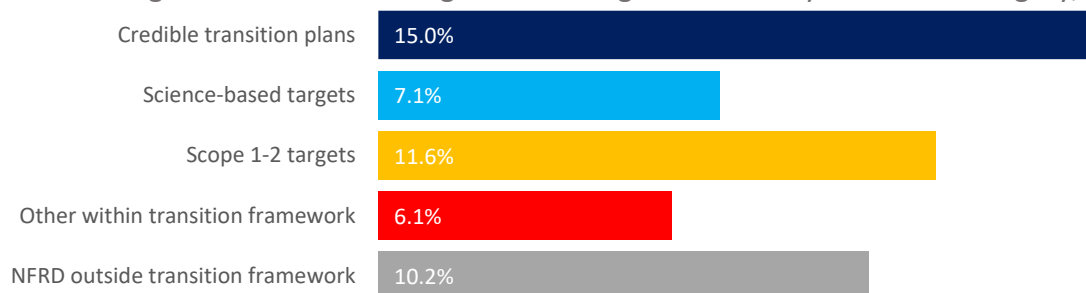
Note: Only sectors issuing more than EUR 1 billion are shown. Only issuing companies matched with Orbis data are included. The category "Other" includes all bonds issued by unmatched sectors (incl. bonds issued from the public sector, financial and non-financial corporates).

Source: Dealogic, Orbis.

The use of green bonds to finance the transition

Corporate transition can be funded by green bonds. The share of green bonds in total outstanding bond amounts by transition tier offers a proxy for the share of green capital available for companies to finance their transition. Companies with elements of credible transition plans (Tier 1) drive transition investments and, on average, exhibit the highest share of outstanding green bonds (15%) (Figure 22). Meaningful transition plans reporting, driven by progress on reporting from Tier 1 companies, could improve access to finance.

Figure 22. Average share of outstanding amounts of green bonds by transition category, 2023



Note: Based on a sub-sample of 447 matched companies from the transition framework with outstanding green bonds as of 31/12/2023. Differences in company size in each tier are accounted for through weighted averages.

Sources: DCM, CDP.

Equity financing – important to support green corporate growth

Equity markets in support of corporate growth

Venture Capital / Private equity (VC/PE) funds play a pivotal role in fostering company growth, often providing the early-stage or growth-stage funding and enabling rapid businesses scale up. However, these funds usually aim for substantial returns within a specific and finite time frame. To realise these returns, VC/PE companies must eventually exit their investments, often seeking avenues that maximise value.

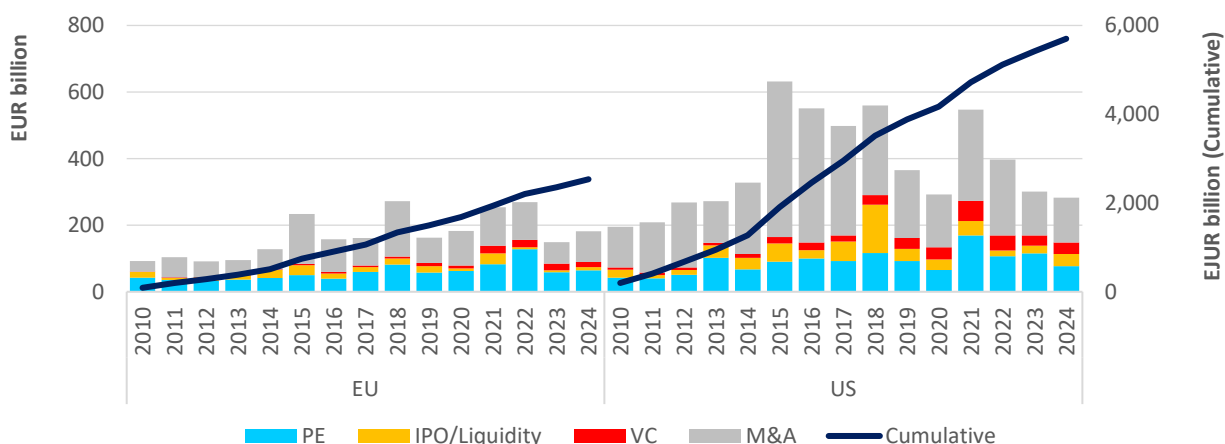
Going public through an Initial Public Offering (IPO) is one of the exit strategies for PE funds, alongside trade sale and secondary market, i.e. acquisition by another VC/PE fund. By listing a company on public markets, PE investors can unlock the value created during their investment period while providing the company with access to a larger pool of capital. For the company, going public offers dual benefits: enabling original investors to exit while securing substantial funds for growth initiatives, such as technological innovation, geographic expansion, or meeting sustainability goals.

In addition, being listed allows companies to raise large amounts of money through follow-on offerings, providing additional capital for expansion or strategic initiatives. Follow-ons are particularly advantageous for companies, as they enable them to raise substantial funds quickly, frequently, and often at a lower cost of equity than private financing. Public markets also offer increased visibility, credibility, and liquidity, which can help attract new investors, talent, and strategic partnerships—further fuelling long-term growth. This is particularly relevant for cleantech companies, which often require substantial capital to scale their innovative solutions aimed at addressing environmental transition. Going public also allows these companies to appeal to a growing base of ESG investors who prioritise sustainable and responsible business practices.

Sustainability-related private equity investments increase but limit data granularity

Cleantech startups typically face high risks and long development timelines, making traditional financing less accessible. Venture capital/Private equity, with its focus on high-growth potential and long-term value creation, is well-suited to support these companies through their early challenges, offering not only capital but also strategic guidance and industry connections that help them grow and attract further investment.

Figure 23. Annual and cumulative volumes of private equity capital invested in the EU and the United States by type of investor, 2010-2024



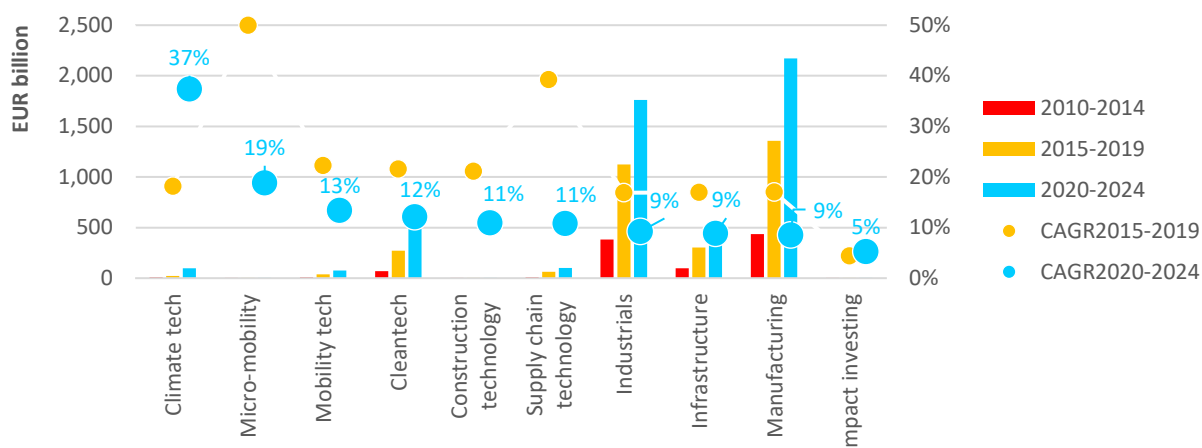
Note: Capital invested in the following sectors (verticals): Cleantech, Climate tech, Construction technology, Impact investing, Industrials, Infrastructure, Manufacturing, Micro-mobility, Mobility tech, Clean energy and Supply chain technology. The sustainability performance of the underlying investee companies has not been assessed.

Source: PitchBook Data, Inc.

Recently, the volumes of private equity investments have increased significantly. They are becoming an important driver of capital allocation towards innovation and growth activities (Eccles *et al.*, 2022). Private equity and venture capital investments in the EU peaked in 2021 at close to 100 EUR billion or 1% of GDP, increasing almost seven-fold since 2015, when they were less than 0.1% of GDP (EU Commission, 2024c). Between 2021 and 2023, private equity and venture capital companies invested EUR 39 billion in European companies, developing climate, clean tech, mobility tech and low-carbon energy. Capital invested in broader EU sustainability-related activities²⁶ averaged EUR 224 EUR billion over 2021-2023, a 2.5-fold increase relative to 2010 (EUR 92 billion). This is yet significantly lower than the average capital volumes invested yearly in the US over the same period (over EUR 400 billion) (Figure 23). In the coming years, PitchBook estimates that up to EUR 212 billion could be further invested in sustainability-related sectors in the EU (cumulative dry powder, i.e. the amount of a company's committed but unallocated capital, for 3,207 private equity funds worldwide with exposures and stated investment preferences to the relevant European sectors), assuming unchanged strategies and commitments from investment funds.

²⁶ These sustainability-related sectors include cleantech, climate tech, construction technology, impact investing, industrials, infrastructure, manufacturing, micro-mobility, mobility tech, clean energy and supply chain technology.

Figure 24. Volume of private equity market in the EU by sector, compound annual growth rates, 2010-2024



Note: The sustainability performance of the underlying investee companies has not been assessed.

Source: PitchBook. Note: CAGR = Compound annual growth rate.

There is no universal definition, standard or label yet for private equity green products, which hinders the measurement and comparability of financial flow volumes across types of instruments and products. By the end of 2024, only 16 of the 2180 European listed companies reporting on taxonomy were majority-owned by a private equity company, a venture capital company or a hedge fund (Orbis database).²⁷ Therefore, at this stage, Taxonomy reporting cannot be used to gauge the extent of private equity capital investment into clean technologies. PitchBook’s own industry classification points to strong developments in the European clean tech sector, boosted by industrial and manufacturing activities. The climate, clean and mobility tech sectors – the factories of green technologies – witnessed double digit expansion in 2020-2024 (respectively +37%, +12% and +13% yearly) (Figure 24). In absolute terms, EUR 39 billion were invested annually in these sectors on average between 2021 and 2023. However, startups in the artificial intelligence space are now capturing a lot of investors’ attention to the detriment of climate tech equity financing which decreased 40% in 2024 globally (Ma, 2025).

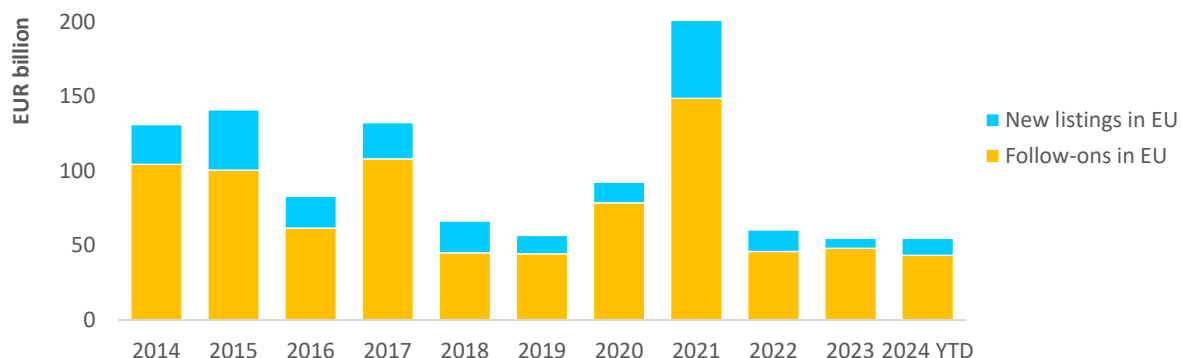
Challenges to monitoring ‘green’ public equity

Public equity markets are shaped by economic cycles, regulatory changes, and some emphasis on sustainability in the EU. After the 2008-09 financial crisis, IPO activity rebounded significantly with regained investor’s confidence, enabling companies to raise substantial capital. Market volatility increased significantly over the last decade, compounded by geopolitical uncertainties, e.g. Brexit, trade tensions, wars in Ukraine and the Middle East. Despite these challenges, 2021 stood out as an exceptional year for public equity markets in the

²⁷ By the end of 2024, 77 EU companies reporting on taxonomy data received investments of more than 10% of their capital from private equity companies, venture capital companies or hedge funds (based on the Orbis database).

EU. Investors' confidence soared as economies recovered from the pandemic, boosted by conducive monetary policies and rising risk appetite. This was particularly beneficial to IPOs in booming sectors such as clean-tech and renewable energy. However, since this peak, market conditions have deteriorated, impeding IPO activity and impacting the volumes of raised capital.

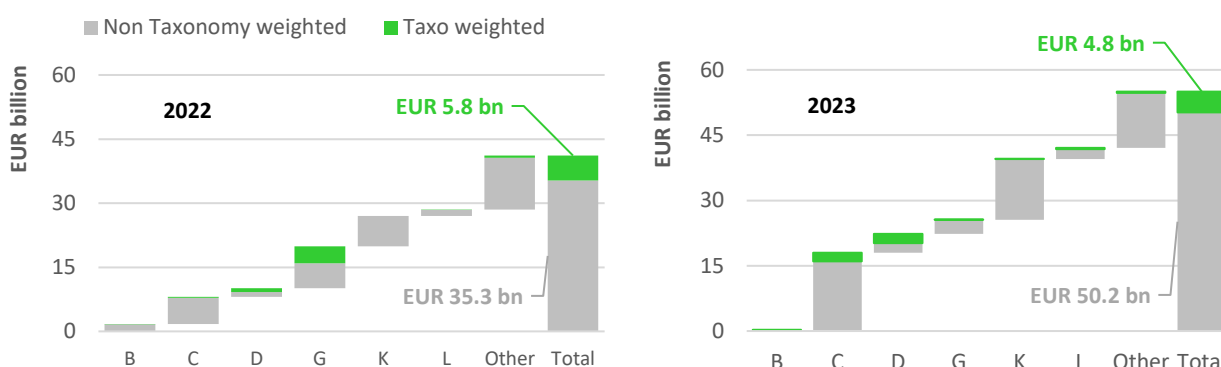
Figure 25. Public equity issuance in the EU, 2014-2023.



Source: Dealogic and Euronext. Note: YTD (year-to-date) refers to end October 2024.

Only modest volumes of general equity were issued in the EU in recent years because of tight market conditions, both in absolute terms and as share of total financing (Figure 25). IPO activity in the EU declined sharply after 2021, dropping from 433 listings to 152 listings in 2022 and just 81 listings in 2023, with raised volumes decreasing respectively from EUR 53.7 billion to EUR 14.3 and EUR 6.8 billion in 2023. Similarly, follow-on offerings, which raised EUR 148.6 billion for a total of 1,026 deals in 2021, fell to EUR 46 billion in 2022 (877 deals) before rebounding slightly to 931 deals with EUR 48 billion raised in 2023. Companies in the manufacturing sector and financial services raised the bulk of capital through public equity financing (Figure 26).

Figure 26. Volumes of public equity issuance in the European Union in selected sectors, 2022-2023.



Notes: Volumes of equity issued are split between NFRD reporting companies (deal values are then weighted by the company's Taxonomy-aligned CapEx) and companies outside NFRD scope. NACE sector selection: B – Mining and quarrying; C – Manufacturing; D – Electricity, gas, steam and air conditioning supply; G – Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles; K – Financial and Insurance Activities; L – Real estate activities.

Sources: Dealogic ECM, Bloomberg, Orbis.

Unlike green bonds, the lack of definition on what may constitute a *green equity* creates a methodological challenge. The volume of financing raised by equity cannot be linked to a specific use of proceeds. Any con-

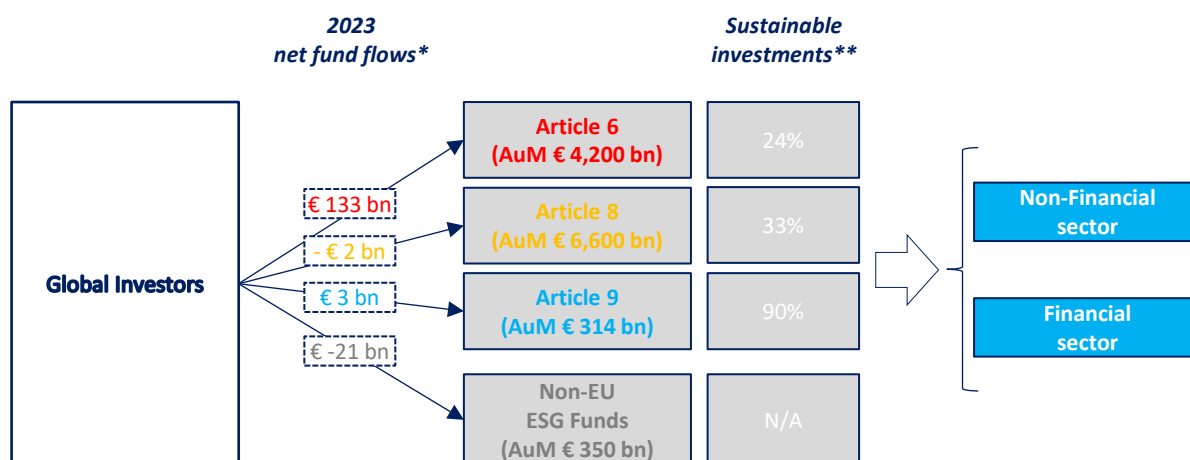
clusion on the role of public equity in supporting the transition should thus be drawn cautiously. The “greenness of equity” can thus only be defined at entity level. However, the below graph makes an attempt to denote the greenness of issued equity by multiplying the issued equity by the share of Taxonomy-aligned CapEx. The result highlights the comparatively low volumes of “green” equity issuance in 2022 and 2023.

Secondary markets

EU investment funds are greening their portfolios

As the main holders of green bonds, investment funds play an essential role in the provision of secondary markets capital to sustainable investments.²⁸ As such, monitoring the fund industry provides insight from several perspectives (Figure 27). First, relative changes in *investor allocations* (net flows) to funds with different sustainability profiles can reflect evolutions in investor preferences. Investor flows in 2023 concentrated into SFDR Art.6 funds (EUR 133 billion), while Art.8 and Art.9 funds received virtually no new money on aggregate, following several consecutive years of inflows.²⁹ This possibly reflected a slowdown in the take up of ESG investing due to some investors scaling back their sustainability focus.

Figure 27. Framework for monitoring fund flows into sustainable investments



Sources: Morningstar, European ESG templates, ESMA.

Note: (*) Net fund flows into equity, fixed income and allocation funds. Non-EU ESG funds include US and JP ESG funds only. (**) Last reported investments based on a sample of 8,798 Art. 6 funds, 10,547 Art. 8 funds and 888 Art. 9 funds disclosing information using SFDR templates, as of March 2024.

Second, changes in the *share of ESG funds* available in the market highlight the industry response to perceived changes in investor preferences (albeit with a lag), as well as fund managers’ expectations regarding future

²⁸ This section uses ESG instead of sustainability as it is a broadly used term in asset management.

²⁹ Based on a sample of 30,000 EU-domiciled funds publicly available for sale (source: Morningstar). SFDR Art.8 products promote environmental or social characteristics while SFDR Art.9 products have sustainable investment as their objective.

market trends in sustainable investing. From this perspective, the broadly steady share of Art.8 and 9 funds in the EU investment fund market in 2023 (at 59% and 3% of EU fund assets, respectively) suggests that the EU fund industry has not significantly scaled back yet its offering of sustainability-oriented investment products to EU investors, despite the change in investor mood highlighted above.³⁰

Third, changes in the *portfolio investments* of ESG funds can signal whether EU fund managers are still greening their portfolios and providing additional financing to support the transition. The evidence collected for this report confirms that EU fund portfolios are becoming more sustainable, possibly compensating for slow-down in the take up of ESG investing and leading to a net positive impact on sustainable investments. This is reflected in the gradual increase in portfolio share of sustainable investments reported by managers through SFDR disclosures, as well as the substantial increase in green bond holdings based on portfolio holdings data.

The observed greening of EU portfolio investments appears to result from a combination of improved data availability and quality from regulatory reporting, and actual increases in the figures reported. Between March 2023 and September 2024, the share of SFDR Art.8 and 9 funds reporting a minimum proportion of sustainable investments in their portfolio increased from 69% to 86%. Meanwhile, the proportion of sustainable investments itself has increased for both SFDR Art.8 and Art.9 funds.³¹

Significant disparities remain amongst SFDR Art.8 funds, which capture a wide array of investment products with very different ESG strategies and different degrees of commitment to sustainable investments which is most apparent when looking at Taxonomy-aligned investments (Figure 28, left panel). More generally, significant reporting of zero Taxonomy alignment in Art.8 and 9 funds remains, while the concept of sustainable investment (SFDR Art.2(17)) is well established among Art.9 funds, with a large majority of these reporting more than 90% of sustainable investments (Figure 28, right panel).

A particular area of interest in secondary markets is fund portfolio investments in green bonds. Trends in green bond holdings can help understand whether savings are being successfully channelled into sustainable investments through financial products, and the sustainability-related features of the funds that are undertaking most of the financing.

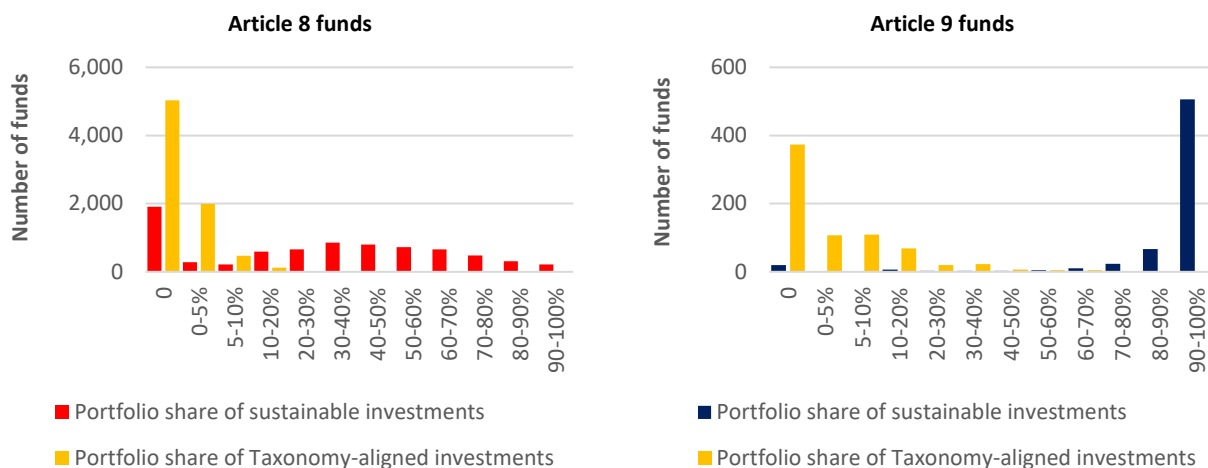
In 2022 and 2023, EU fund investments into green bonds have increased from EUR 210 billion to 385 billion, or 83%, with most of the green bonds held in Article 8 fund portfolios (Figure 29; left panel). Green bond

³⁰ Based on a sample of 20,000 EU-domiciled funds disclosing information using the SFDR templates (source: Morningstar). Close-ended funds (which account for around a third of total EU net fund assets according to EFAMA) largely remain a blind spot at this stage due to the limited availability of information on the large majority of these funds and absence of granular information on their investments.

³¹ Source: Morningstar SFDR Article 8 and Article 9 funds, Q1 2023 and Q3 2024.

investments outpaced green bond market growth, with the total value of EU green bonds outstanding increasing by 64% over the same time frame. As a share of EU fund portfolio investments, green bond holdings rose from 2.2% to 3.3%. Growing investments into green bonds are most visible in Article 9 fund portfolios, where the share of green bonds in total investments rose from less than 10% to 17% (Figure 29; right panel), despite the relatively larger share of equity funds in Art.9 funds.

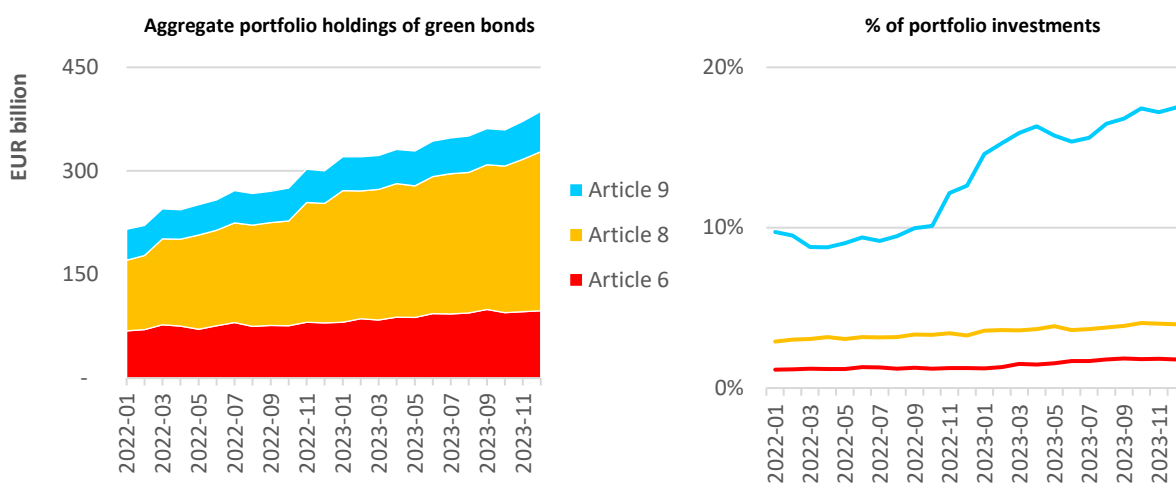
Figure 28. Number of funds by portfolio share of sustainable investments and Taxonomy-aligned investments, Article 8 funds (left) and Article 9 funds (right).



Source: ESMA, Morningstar, Q3 2024.

A majority of the green bonds held by funds have been issued by non-financial corporates (EUR 200 billion or 52% of the total), highlighting the central role of the EU fund industry in financing the green transition and climate solutions to support the broader decarbonisation of the economy (see Box 5).

Figure 29. Aggregate fund portfolio holdings of green bonds by SFDR fund type, in EUR billion (left) and % of portfolio investments (right).



Note: Total investments into green bonds per SFDR Article type.

Source: ESMA, Morningstar.

Note: Investments into green bonds per SFDR article type as share of total investments.

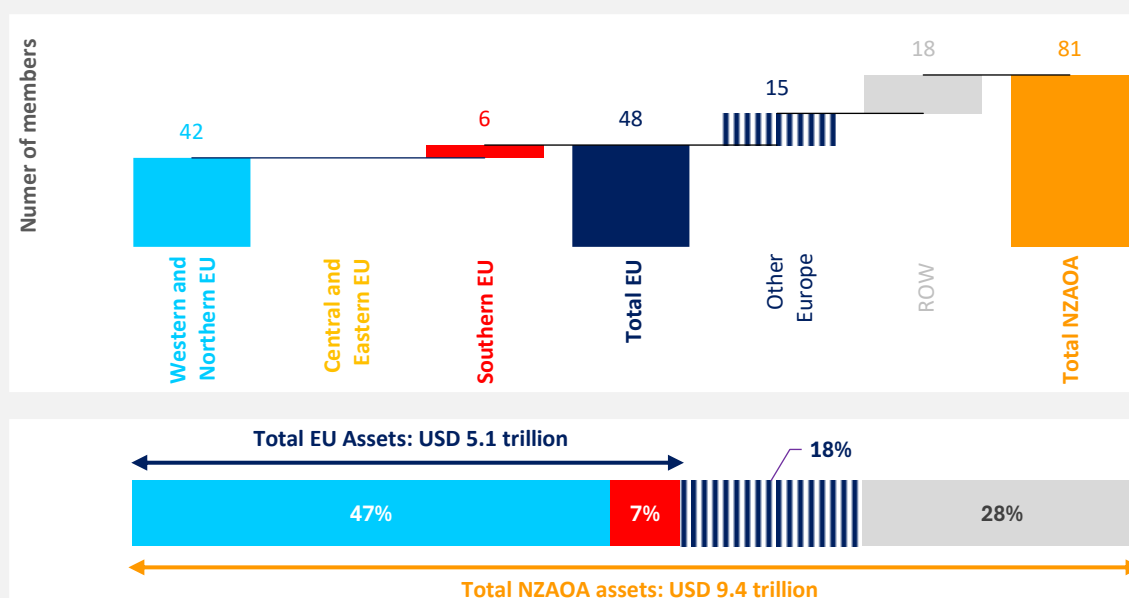
Source: ESMA, Morningstar.

Box 5. Net Zero Asset Owner Alliance

As detailed in the Net Zero Asset Owner Alliance’s (NZAOA) Target-Setting Protocol (2024a), three main levers of influence are available to asset owners to reach net zero emissions — allocation of capital to transition-focused businesses; proactive engagement with key stakeholders; and contributing to changing the norms and standards in the investment ecosystem.

At time of data collection, the Alliance’s membership includes 81 asset owners, including 48 in the EU who reported data, with assets under management (AuM) of USD 9.5 trillion (USD 5.1 trillion for EU members, i.e. around a quarter of the total net assets of EU funds according to EFAMA data). A total of 81 members have now set decarbonisation targets, enlarging the AuM under the Alliance’s target-setting framework to USD 9.4 trillion (NZAOA, 2024b).

Net Zero Asset Owner Alliance Membership and assets under management, 2024



Note: Other European NZAOA members outside the EU: UK (10); Switzerland (4); Norway (1)

Source: Net Zero Asset Owner Alliance.

The NZAOA membership distribution in the EU is tilted towards asset owners in Western and Northern Europe with 42 out of 48 members and notably no members from Central and Eastern Europe. Similarly, 87% of the assets under management by European members or USD 4,4 trillion belong to members in Western and Northern Europe.

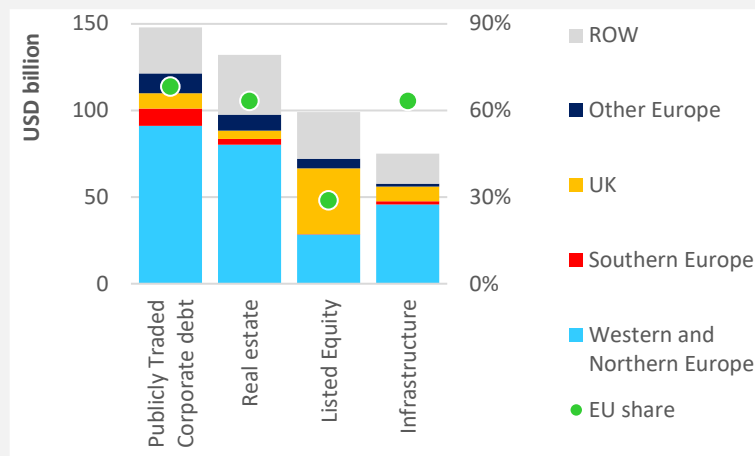
80 target-setting members have set targets for their investments in climate solutions. Overall climate solutions investment in 2023 reached USD 555 billion and represented 6% of total AuM (compared to 4.6% in 2022). The majority of members’ climate solution investments were directed to corporate bonds and real estate in 2023, with EU members accounting for around two thirds of the total. Nevertheless, investments in private assets marked a notable increase, more than doubling to USD 33 billion since 2022.

Box 5. Net Zero Asset Owner Alliance (Continued)

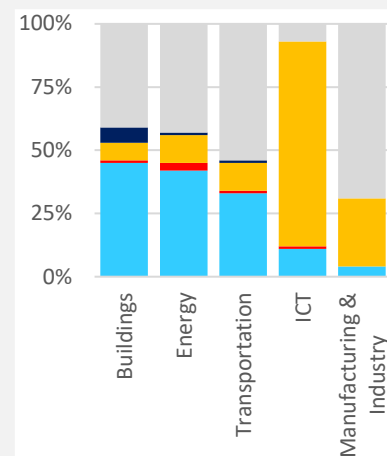
Most EU member investments in climate solutions focused on three sectors: buildings, energy and transportation (NZAOA, 2024b), matching the overall share of assets of EU institutions. However, the low share of EU investments in climate solutions in ICT and practically zero investments in Manufacturing & Industry stands out in the data.

Net Zero Asset Owner Alliance Membership and assets under management, 2024

Investments in climate solutions by asset class, 2024



Distribution of investments in climate solutions by sector, 2024



Note: The Platform has no opinion on the credibility of the transition disclosures of NZAOA members.

Source: Net Zero Asset Owner Alliance.

Round-up

The main objective of this section is to understand how much money is channelled to EU sustainable investments through green finance instruments. Given the scope of this report and the EU Platform on Sustainable Finance mandate, this was done by estimating the volumes of green financing provided to EU-domiciled financial and non-financial sector entities through financial instruments. However, this approach leaves out important sources of financing of investments by EU companies, namely i) retained earnings financing green Capex; ii) financing by non-EU entities, except where such financing is channelled through EU instruments (e.g. US investors buying green bonds). Moreover, data limitations imply that the coverage may vary across sectors and instruments, complicating the reconciliation of information gathered from multiple sources that already rely on inconsistent definitions of ‘sustainable’ or ‘green’ instruments and different methodologies.

Overall, a wider adoption of green financing instruments and products will foster the transition in the real economy. The bulk of green financing in the EU appears to be raised through debt instruments, with the total outstanding amount of green debt financing the non-financial sector and households estimated at EUR 1.15

trillion at the end of 2023. This was split almost evenly between green mortgage to households on the one hand, and corporate borrowing and green bond financing on the other hand. It is worth highlighting that only around half of overall green lending is green as per the Taxonomy-aligned definition, although this might reflect methodological or data limitations to some extent. Taxonomy alignment information is currently limited for green bonds.

While flow data are not available yet for the banking sector, EU green bond issuance averaged more than EUR 200 billion per year between 2021 and 2023 including around half from private sector entities – with the bulk of it held by EU investment funds and insurers. This compares with around EUR 5 billion per year in estimated Taxonomy-aligned equity issuance between 2022 and 2023 – albeit relying here on a narrower definition of ‘green’ finance in the absence of widely recognised industry standards or labels for green equity. In contrast, the estimated annual volumes of climate-related private equity investments averaged EUR 224 billion per year between 2021 and 2023, highlighting the important role of private finance in supporting green innovation and growth in the EU.

A growing amount of green debt securities are held by EU funds, despite investors scaling back their investments into sustainability-oriented funds in 2023. This is particularly the case for SFDR Art.9 funds, which have seen their green bond holdings rise from 10% to 17% of their portfolio investments in two years. Meanwhile, SFDR disclosures show that the proportion of sustainable investments has been increasing in both SFDR Art.8 and Art.9 funds. Reporting of Taxonomy-aligned investments by fund managers, on the other hand, is still largely missing. Taken together, these findings suggest that EU funds have been greening their portfolios in recent years. However, decreasing investor demand for ESG funds in general since 2023, and for Art.9 funds in particular, risks undermining EU climate objectives by limiting the availability of financing for green investments. The future SFDR Review may help by providing greater clarity between different types of ESG funds and their potential contribution to the transition.

Notwithstanding methodological limitations, these numbers also underscore the imbalance at EU level between green debt and green equity financing. EU banks and green bond markets already provide significant volumes of green financing, despite regional differences, which are being channelled into key sectors such as energy, mobility and housing. In comparison, green public equity financing appears somewhat limited, reflecting the absence of established green labelling or standards, with the bulk of issuance done by large EU companies while EU start-ups beyond a certain size frequently resort to non-EU markets to obtain external financing (Draghi, 2024). This feature highlights the importance of establishing a Savings and Investment Union to accompany the growth of EU companies contributing to the EU climate objectives. Improved capital market efficiency can reduce private financing costs and unlock the green private equity financing which

plays a vital role for financing undersupplied innovative clean tech companies. For instance, with higher investment levels of EU pension plans in growth-stage strategic and critical technology companies in the EU (Draghi, 2024).

Selected use cases

The scope of the monitoring framework allows for a broad range of policy-relevant analysis, beyond the general state of play on sustainable investments and their financing laid out in the preceding chapters. This chapter shines a light on more specific regional and sectoral outcomes of the green transition.

Towards a green Savings and Investment Union

Background

The need to address the fragmentation of capital markets, long identified as the root cause of eroding EU competitiveness, emerged as a priority in recent policy debates (Draghi, 2024, EU Commission, 2025a). Completing the Capital Markets Union would generate an impactful economic stimulus to the European economy, with EUR 470 billion in additional investments per year (von Der Leyen, 2024). This is also a major impediment to a green and inclusive future for European Member States. There is now consensus on the establishment of the *Savings and Investments Union* proposed by Enrico Letta (Letta, 2024). The *Savings and Investments Union* is expected to boost investments and improve access to capital for businesses to compete, innovate, and drive the sustainability transition. Letta sees the green (and digital) transition as the most suited catalyst for transformative change, and a historical opportunity for industrial leadership. The proposal rests on stronger cross-border banking markets, enabling key capital market services and more efficient fund allocation, notably to ensure a broader involvement across all Member States towards the achievement of EU Green Deal goals.

The need for more integrated European economies

The diversity in terms of economic standpoint, financial weight and environmental performance is evident among European Member States (Figure 30).³² Per capita GDP levels are 66% above the EU average among Western and Northern European countries, which also account for 80% of European market capitalisations and more than half of EU greenhouse gas emitted in 2022. At the other end of the spectrum are Central and Eastern Europe countries, with per capita GDP levels a third below the EU average and 5% of market caps. Their footprint on EU emissions is somewhat large (a fifth of the EU total) relative to their economic size due

³² For the purpose of this section, EU Member States are grouped in three regional groups, broadly in line with EU regional cohesion policy: Western and Northern Europe (comprising Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands and Sweden), Central and Eastern Europe (comprising Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) and Southern Europe (comprising Cyprus, Greece, Italy, Malta, Portugal and Spain).

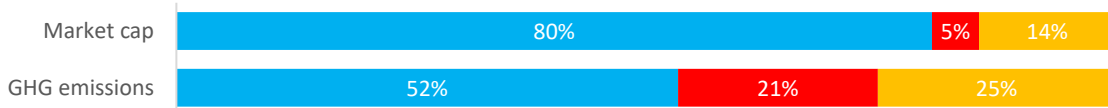
to a lot of legacy and inefficient infrastructures, notably in terms of electricity production capacities. The remaining emissions from Southern Europe make up for 14% of the total. Large discrepancies also exist within regional groups by all measure. Two thirds of emissions come from five of the largest European economies across all regions: Germany, France, but also Italy, Spain and Poland.

Figure 30. Greenhouse gas emissions (2022), per capita GDP and market capitalisation (2023) by country and region relative to EU levels.

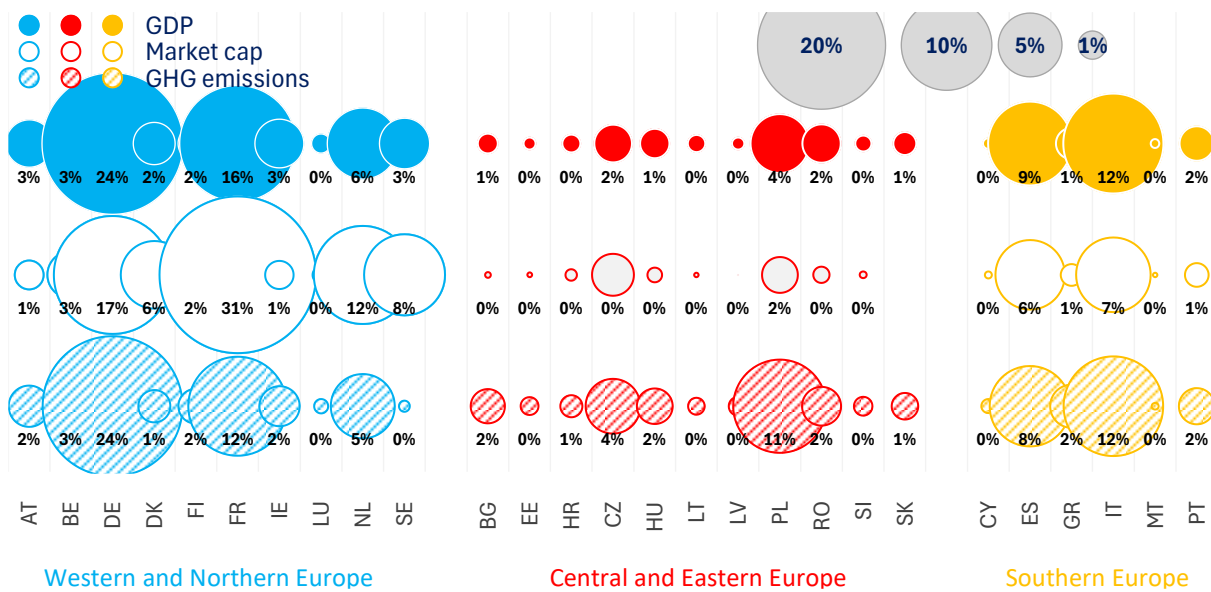
Regional per capita GDP relative to EU average (2023)



Regional breakdown of EU market capitalisation (2023) and GHG emissions (2022)



Country data



Sources: Eurostat, EEA (2024), Euronext.

Real economy investments: Distinct regional imbalances

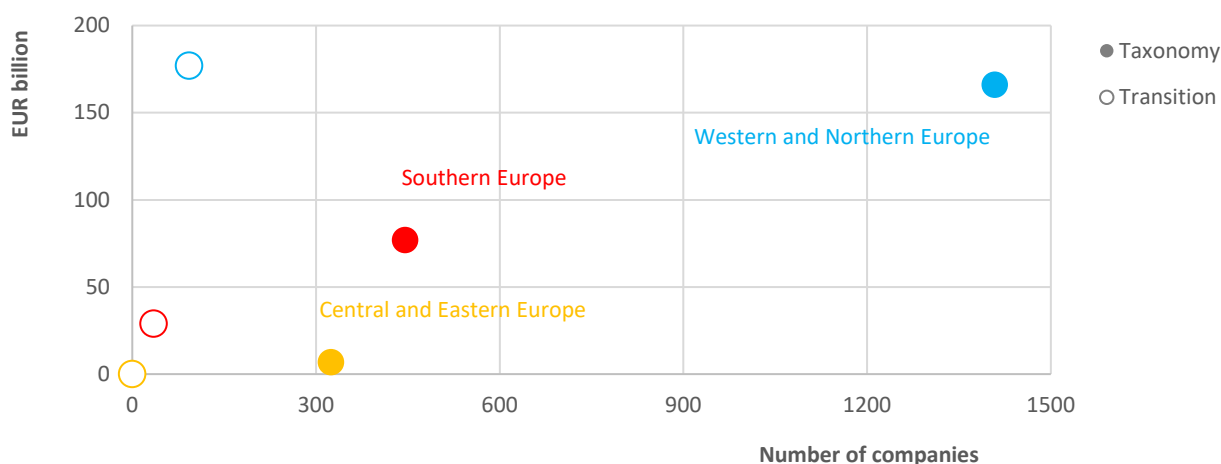
The regional dimension of the monitoring framework provides an important perspective on the reality of the sustainable transformations initiated in Europe. The reported data on sustainable investments can be analysed through the lens of corporate domiciliation and/or grouped by EU regions for a more accurate depiction of the state of play in the real economy.

Taxonomy reporting

Taxonomy disclosures reported for the fiscal year 2023 exhibit regional imbalances (Figure 31). Two-thirds of companies (1,400) accounting for two-thirds of Taxonomy-aligned CapEx (EUR 166 billion) are located in Western and Northern European countries (40% and 35% of aligned CapEx from Germany and France respectively). A total of 770 companies from other European regions (40-60% split between Central and Eastern Europe and Southern Europe) report on Taxonomy but over 90% of their combined Taxonomy-aligned CapEx is from Southern Europe.³³ Moreover, 46% and 53% of Taxonomy-aligned investments were reported from Italian and Spanish based companies, respectively (Figure 32).

The degree of preparedness in reporting on Taxonomy varies across EU-regions. Financial institutions and corporates from some EU area countries are more advanced in the Taxonomy implementation than others, with more significant steps taken by regulators and Euro area Member States towards climate change regulation and reporting requirements (EIB, 2024b). The political willingness to achieve further market integration will likely help overcome barriers to investments, foster access to capital in Central and Eastern Europe and eventually be reflected in the extent and quality of reporting in the region.

Figure 31. Volumes of Taxonomy-aligned CapEx and additional CapEx supporting the transition by European region and number of companies, 2023.



Note: Many Central and Eastern European companies are owned by Western and Northern European companies and therefore may not be accurately reflected in the data.

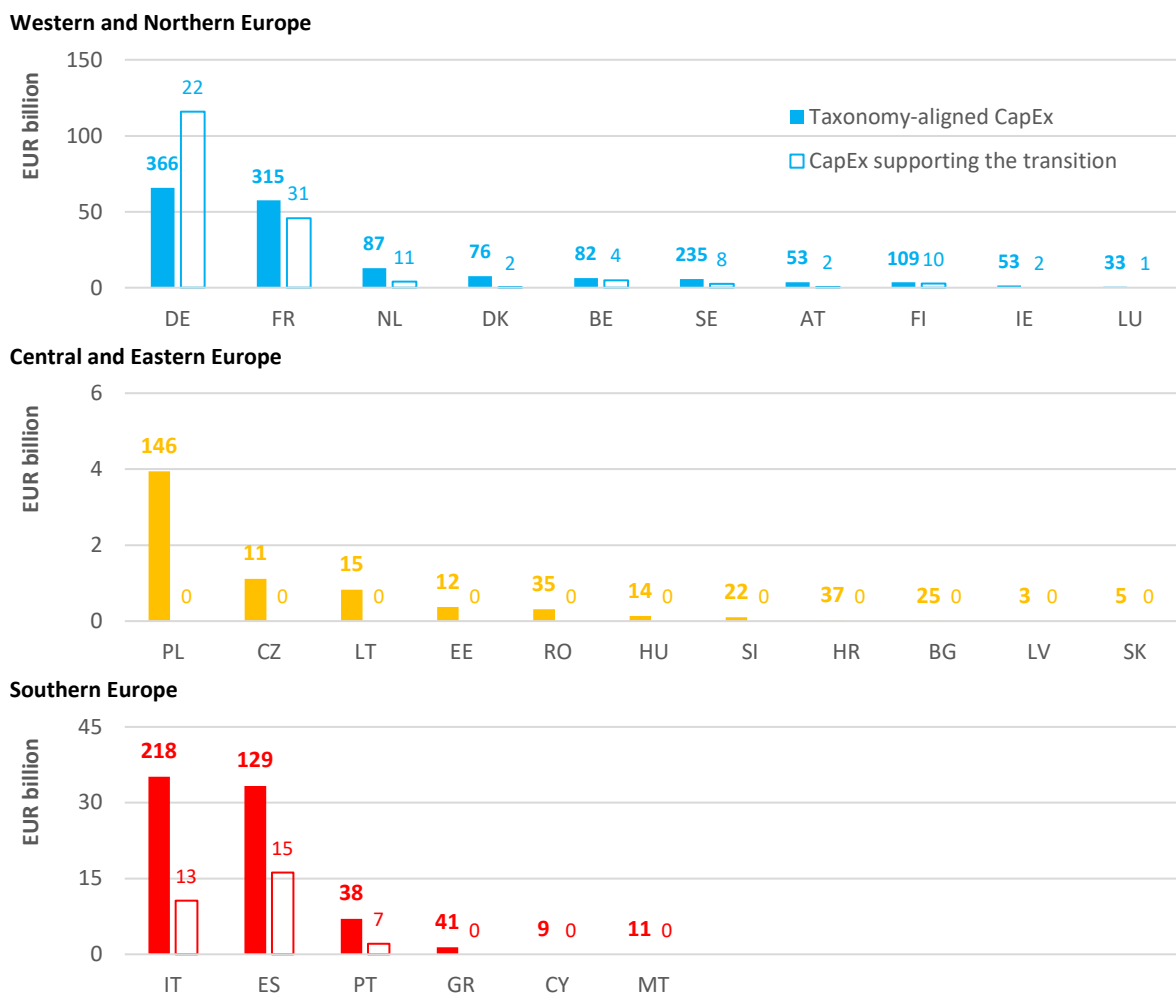
Source: Bloomberg, Orbis.

³³ Central and Eastern European companies are owned by companies headquartered in other parts of the EU, thereby affecting the patterns of regional reporting highlighted in this section. See Annex A2 for a discussion on reporting shortcomings.

Additional CapEx supporting the transition

The geographical distribution of companies with mature transition plans is also skewed towards Western and Northern European countries (56% of EU total) and the remaining share in Southern Europe. No companies with elements of credible transition plans could be identified in Central and Eastern Europe (Figure 32). The skewed distribution may be explained by more listed companies in Western and Northern EU, as well as higher sensitivity to investor’s sustainability requirements. However, as noted many Central and Eastern European companies are owned by companies with headquarter in Western and Northern EU.

Figure 32. Volumes of Taxonomy-aligned CapEx and additional CapEx supporting the transition by EU Member State, 2023.



Note: Labels indicate the number of Taxonomy-reporting companies and the number of entities with mature transition plans. Many Central and Eastern European companies are owned by Western and Northern European companies and therefore may not be accurately reflected in the data.

Source: Bloomberg, Orbis.

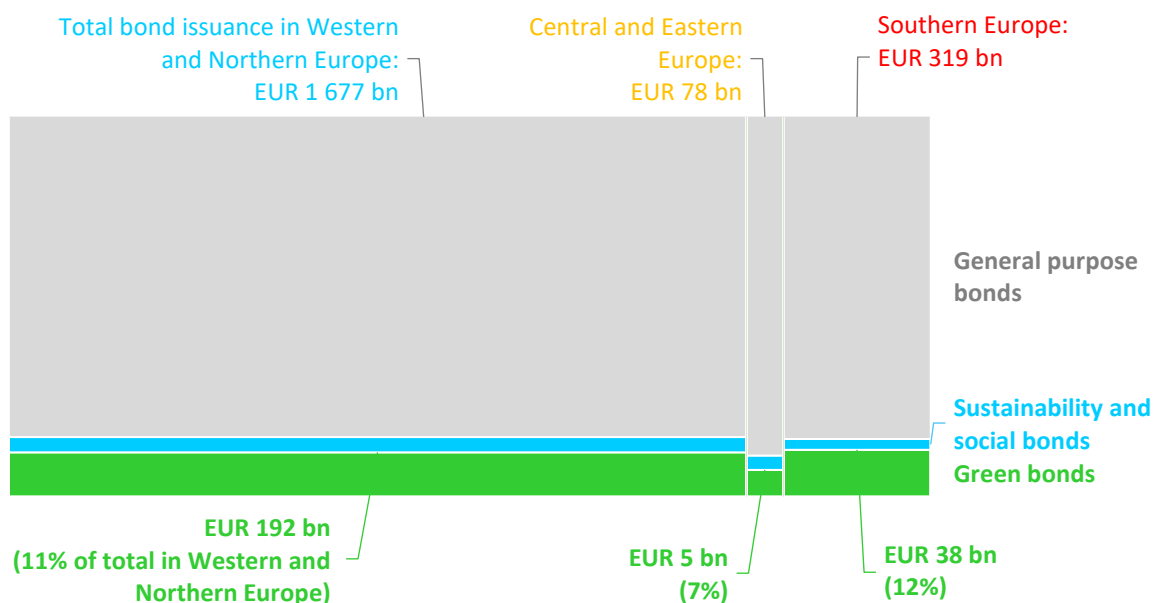
Financial transactions are limited to a few countries

Regional discrepancies in terms of sustainable investments also translate into apparent imbalances in the use of financing instruments. This section only offers a partial view on the use of financial instruments in support of sustainable investments due to a lack of granular data at country/regional level.

Green bonds

Green bonds represented equivalent proportions of total bonds issued in both Western and Northern Europe (11%) and Southern Europe (12%) (Figure 33). But unsurprisingly, Western and Northern countries are the main recipients of sustainable investments to date and therefore required the largest amounts of capital to finance their transition. Green bond issuance in the region rose to EUR 190 billion in 2023, five times larger than volumes in Southern European countries. With 7% of total bond issuance, green bonds (and general-purpose bonds) are less common financing options in Central and Eastern Europe in volume and share terms.

Figure 33. Bond issuance in EU27 by subregion and type, 2023 (EUR billion)



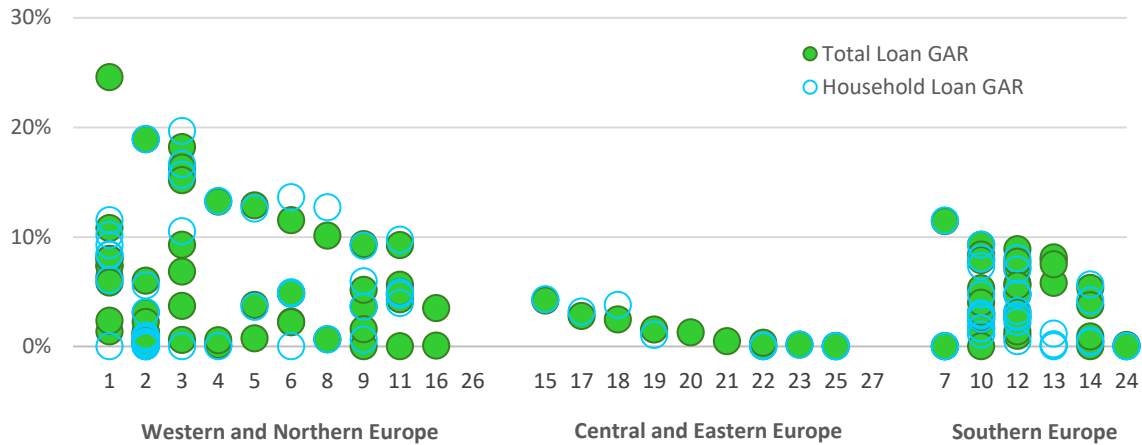
Source: Dealogic DCM.

Loans

Green asset ratios for banks' loan portfolios show wide differences across and within countries (Figure 34). The share of total Taxonomy-aligned loans ranges between zero and almost 25% across EU banks, reflecting both the geographical differences in Taxonomy alignment among NFCs and mortgages but also some diversity in reporting interpretations. As of June 2024, the EU average stood at just over 6%. Banks' Taxonomy-aligned lending share to NFCs in many cases tends to be higher (ranging between zero and 50%) than the

overall Taxonomy-aligned lending share. The EU average GAR for EU banks' NFC and household lending portfolios stood at around 6.4 % and 7.4 %, respectively as of June 2024.

Figure 34. Total loan GAR and household loan GAR, by bank per country/region, Q2 2024

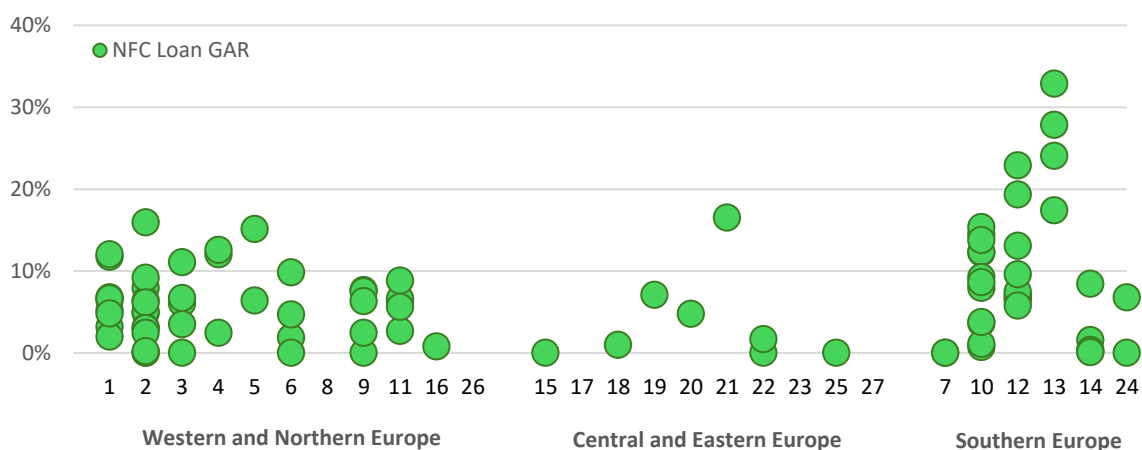


Source: EBA.

Note: Loan GARs are calculated with symmetry in the numerators and denominators; only loans included for Taxonomy alignment assessment in the GAR numerator are included in the denominator.

Notable regional differences exist, with Northern and Western European banks reporting sometimes substantially higher shares of total Taxonomy-aligned lending. A similar pattern is observed in the household segment, where Taxonomy-aligned lending represents mainly loans collateralised by immovable property. For the NFC loan segment, Southern European banks generally report higher Taxonomy-aligned lending shares.

Figure 35. Non-financial corporates loan GAR, by bank per country/region, Q2 2024



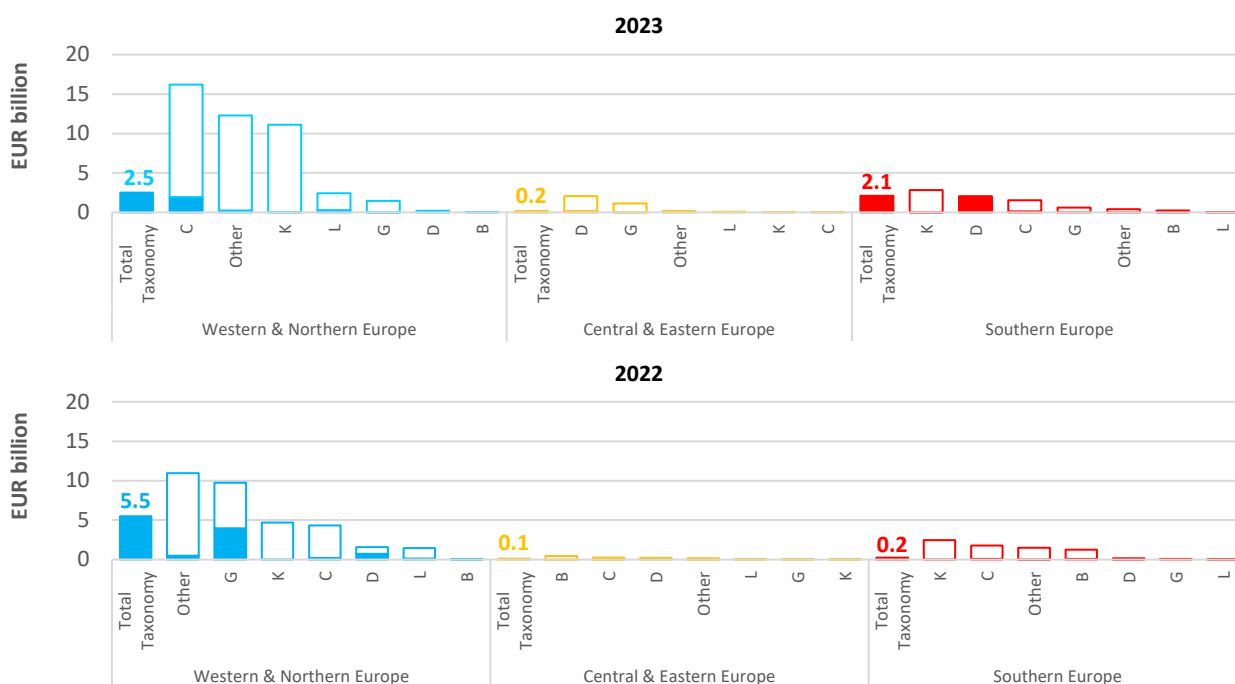
Source: EBA.

Note: Country numberings indicate a country's ranking across the EEA according to each country's highest bank-level total loan GAR represented in Figure 34. Countries for which no data has been reported, or data has been reported only with empty values, are not included. Bank samples can vary across indicators. Source: Data collected by the EBA on Commission Implementing Regulation 2022/2453 Template 7.

Public equity

The downturn of public equity markets in the last two years was highlighted in the previous Chapter, with few transactions made yearly by region (Figure 36). General conclusions on public equity as an opportune instrument to finance sustainable investments in a given region should thus be avoided. In 2023, public equity transactions were split between Western and Northern European companies and Southern European companies. In 2022, the bulk transactions were limited to Western companies.

Figure 36. Public equity issuance by EU region and sector, 2022-2023.



Note: Plain bars and “Total Taxonomy” total refer to volumes of public equity issued by NFRD companies and weighted by their Taxonomy-aligned CapEx. NACE sector selection: B – Mining and Quarrying; C – Manufacturing; D – Electricity, Gas, Steam and Air Conditioning Supply; G – Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles; K – Financial and Insurance Activities; L – Real Estate Activities.

Source: Bloomberg, CDP, Orbis.

Round up

The regional dimension of the monitoring framework brings to light essential elements for a more effective and more inclusive green financial architecture across Europe, in line with the bloc’s aspiration to establish a green Savings and Investment Union. To date, the successful implementation of the Taxonomy regulation remains too limited to a few leading countries, where large corporations, with sizable portions of their investments earmarked as Taxonomy-aligned, are domiciled. Credible transition plans are even more restricted geographically and absent from Central and Eastern Europe, where the stakes of the green transition are often the highest. The same regional imbalances apply to the capital markets with the issuance of green bonds and also reflected in green asset ratios for banks’ loan portfolios.

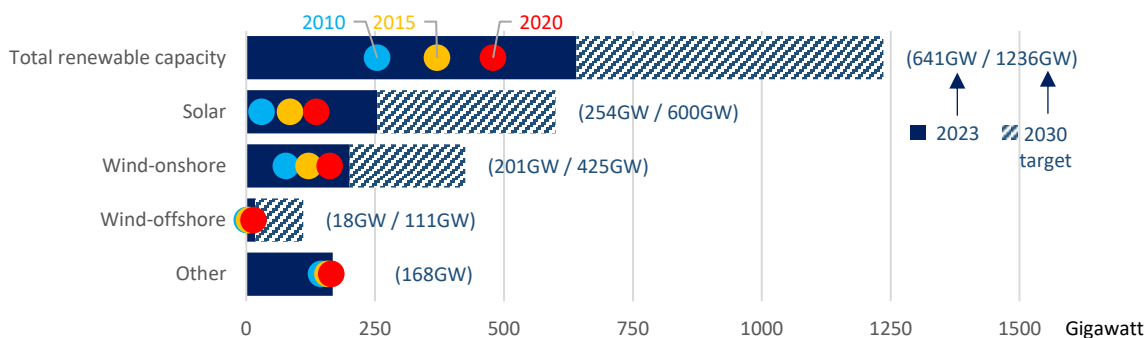
Sectoral deep dives: Power and car manufacturing

Setting the scene

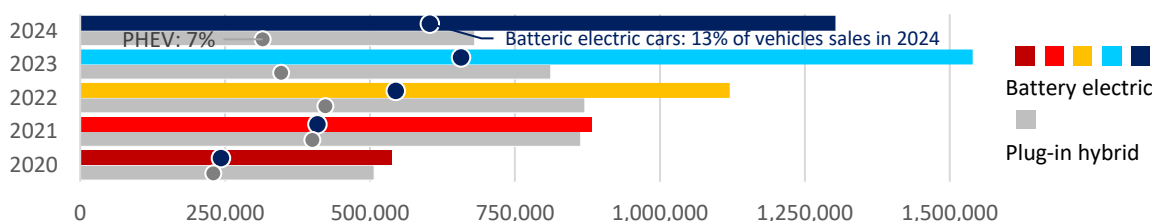
The state of play in the real economy (Chapter 1) brought to light the leading role of power utilities and car manufacturers in sustainable transformations and associated investments. The deep dives contained in this section add context to the recent developments in these two sectors and highlight the progress made by two sectors at different stages of their transitions. More generally, this section illustrates the type of sectoral analysis allowed by the monitoring framework, in connection with specific sectoral policy targets defined by the European Commission and its Member States (Figure 37). Low carbon technologies have become default options for power utilities, led by rapid solar and wind expansion, while robust demand for low-carbon vehicles transforms the car making industry³⁴. One in every five cars sold in Europe is now electricity powered (battery and plug-in hybrid combined), despite a slowdown recorded during the second half 2024.

Figure 37. Recent trends in EU low-carbon energy technology developments

Installed capacity by renewable source, 2010-2023; EU targets for 2030



New electric car registrations in the EU, 2019-2023, market shares (%)



Source: EIB (2025) based on IEA (2024); ACEA.

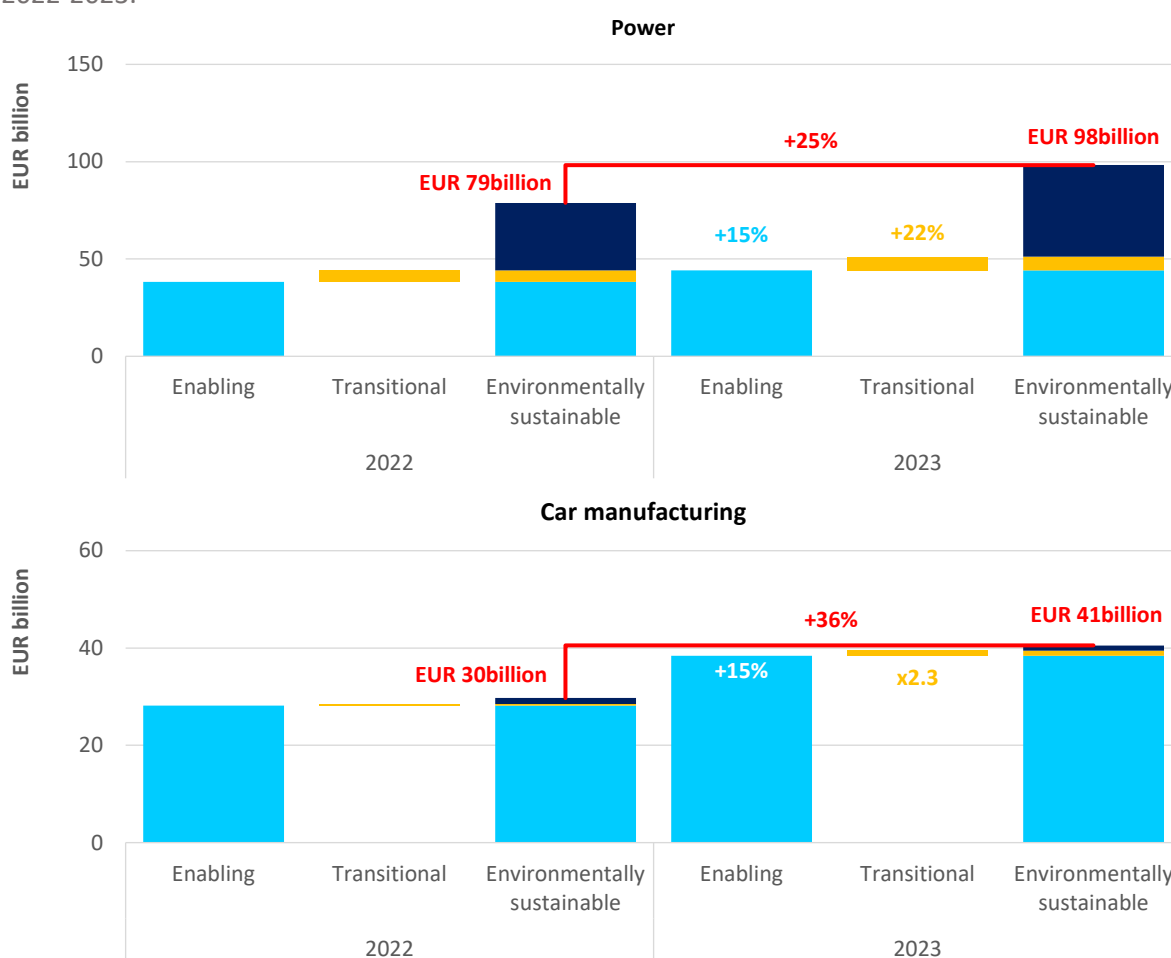
³⁴ Car manufacturing activities, referred to as “Car manufacturers” in this Chapter, consists of activities in the following NACE categories: C27.1.1: Manufacture of electric motors, generators and transformers, C27.2.0: Manufacture of batteries and accumulators, C27.3.2: Manufacture of other electronic and electric wires and cables, C29.1.0: Manufacture of motor vehicles, C29.3.1: Manufacture of electrical and electronic equipment for motor vehicles, N77.1.1: Electric vehicles; electric machinery; green buildings.

Real economy investments: Different states of transition between sectors

Taxonomy-aligned CapEx

Power producers and network operators, the frontrunners of the green transition in Europe, reported EUR 98 billion in Taxonomy-aligned CapEx for 2023, a 25% rise from 2022 volumes (Figure 38). Two-thirds of the increase stemmed from sustainable investments (+36% relative to 2022) confirming the sector's readiness to foster the replacement of power generation based on unabated fossil-fuels, often renewable-based. CapEx volumes reported as enabling CapEx progressed more slowly, mainly due to how energy activities are labelled in the Taxonomy.

Figure 38. Breakdown of Taxonomy-aligned CapEx by category in the power and car manufacturing sectors, 2022-2023.



Note: Universe of companies limited to EU companies under NFRD scope as consolidated by Bloomberg.

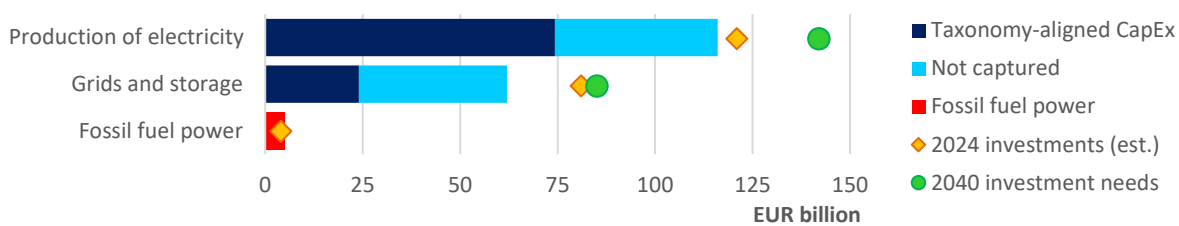
Source: Bloomberg, Orbis.

The nature of Taxonomy-aligned CapEx reported by car manufacturers points to a different reality. Taxonomy-aligned CapEx increased in equivalent proportions to the power sector (+ 36%) to reach EUR 41 billion in 2023, driven essentially by enabling CapEx. Transitional CapEx is insignificant. There is thus great potential

for the car manufacturing industry to turn CapEx into sustainable investments and align with the Commission's zero emission vehicle objective for 2035.

The monitoring framework coverage for corporate investments in the power sector is very encouraging: They correspond to two-thirds of total investments consolidated by the International Energy Agency for 2023. One third of network investments are captured, although network operators are often publicly owned and thus outside of the NFRD scope. (Figure 39).³⁵ According to the IEA, current annual power sector investments (production and network combined) are also 15% below the 2040 needs assessed by the Commission.

Figure 39. Taxonomy-aligned investments and power sector investments in the EU not captured by the monitoring framework, 2023.



Source: Bloomberg, Orbis, IEA (2024), EU Commission (2023).

Investments supporting the transition

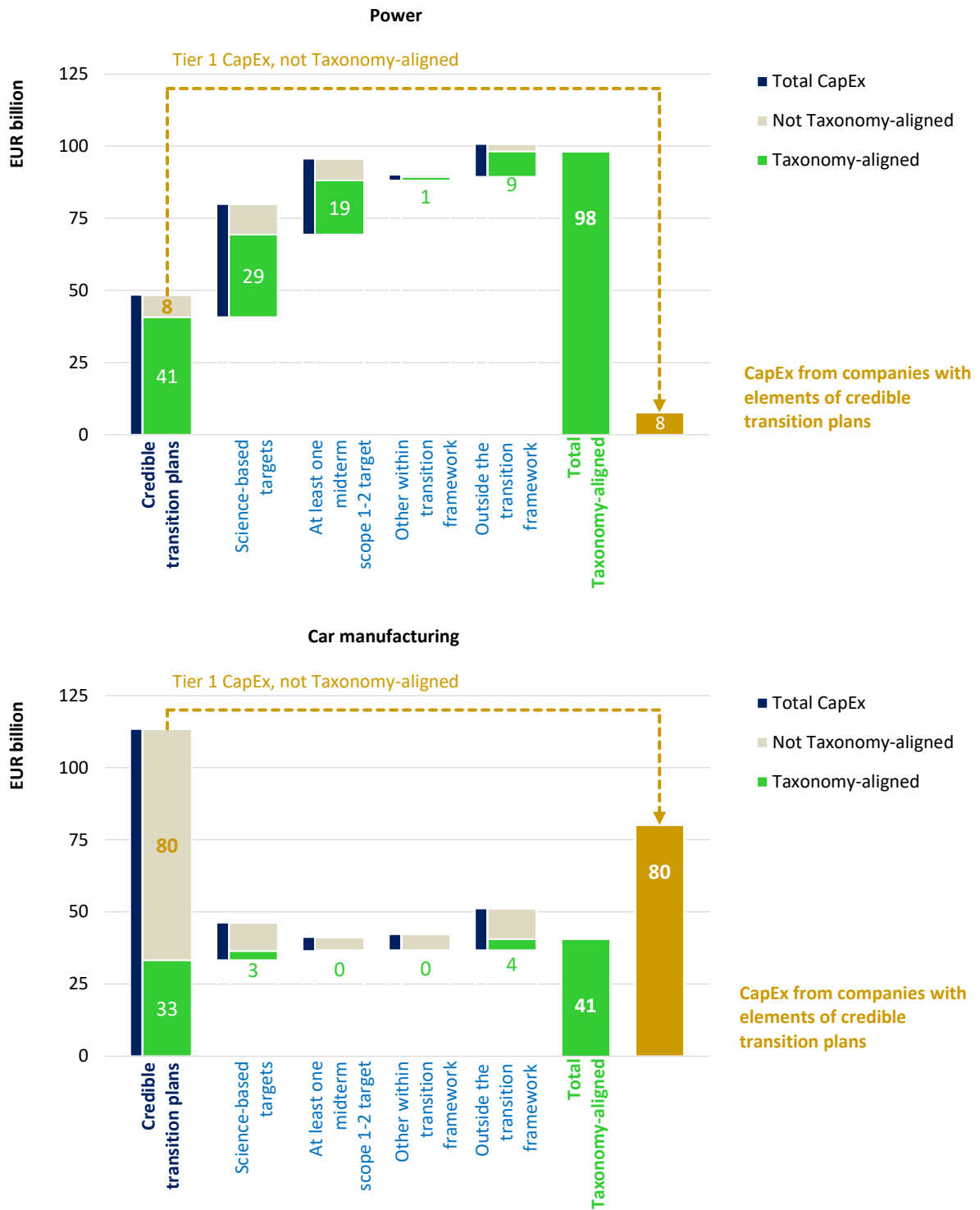
The forward-looking nature of CapEx is a key indicator of the transition path followed by companies, and an indispensable feature of credible transition plans. These credible transition plans inform direction on transition, including on the phase out of carbon intensive activities, e.g. inefficient gas, oil or coal-fired power plants.

The transition framework put into practice in Chapter 1 also reveals differences between the power and car manufacturing sectors. Among power companies with elements of credible transition plans, 84% of CapEx is already Taxonomy-aligned. This leaves only EUR 8 billion of remaining CapEx earmarked as supporting the transition (Figure 40). Power companies in lower tiers of our transition categorisation framework, particularly those with Science-Based targets, have more room to turn CapEx into Taxonomy-aligned investments.

Conversely, the majority (70%) of investments made by car manufacturers with elements of credible transition plans (often very large companies), is not yet reported as Taxonomy-aligned. The EUR 80 billion of CapEx identified as supporting the transition represents a significant opportunity to translate into Taxonomy-aligned CapEx. The transformation of personal mobility, steered by the uptake of electric cars initiated across Europe, offers vast potential to drive transition, create economic opportunities, job creation and strengthen the European competitive position globally.

³⁵ The technology split (solar, wind and other power generation sources) is not available from the Bloomberg database.

Figure 40. From Taxonomy-aligned CapEx to additional CapEx potentially supporting the transition in the power sector, 2023



Note: Companies with elements of credible transition plans were identified through proxies.

Source: Bloomberg, CDP, Orbis.

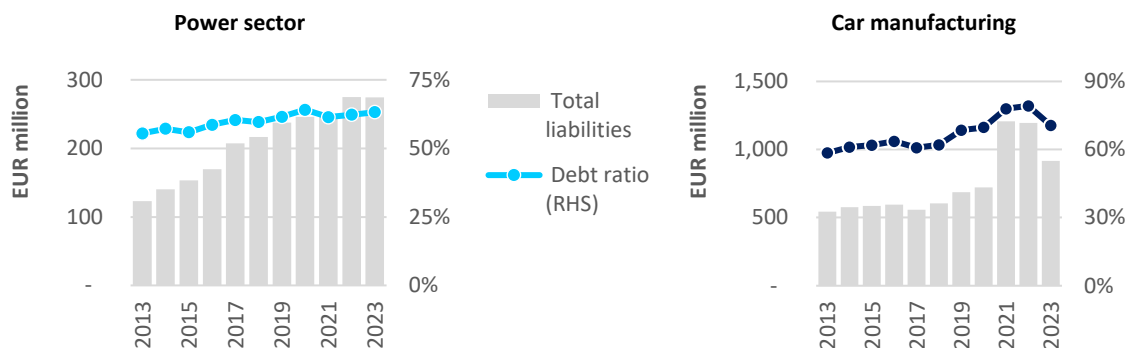
Debt financing in the power and car manufacturing sectors

A successful transition to a greener economy crucially depends on companies' ability to retain a robust business model and aim towards a capital structure optimised for specific market conditions in order remain profitable throughout the process.

In most cases, a high debt level is a temporary strategic decision to enhance future income, desirably through increased operational income. In general, issued/raised equity plays a minor role for listed companies (as earnings retention is a far more relevant factor in volume terms) while dividend payments are traditionally sticky and stable. The capacity for companies to increase their capital (equity) base is essential to expand debt capacity, as it has a multiplier effect.

In the power sector, overall debt levels (stock) are generally stable across time, at a relatively elevated level, near 90% in 2022 (Figure 41). Absolute debt levels in the car manufacturing have risen. Yet, the sector's debt ratio decreased in 2022-2023 following two very profitable years, but as profitability has plummeted debt capacity is also hit. The high debt levels in the power sector also limits the sector's capacity to expand CapEx further with more debt. A general CapEx increase in the power sector would rather be supported with higher revenue levels delivering free cash flow.

Figure 41. Liabilities vs debt ratios in the power and car manufacturing sectors, 2013-2023.

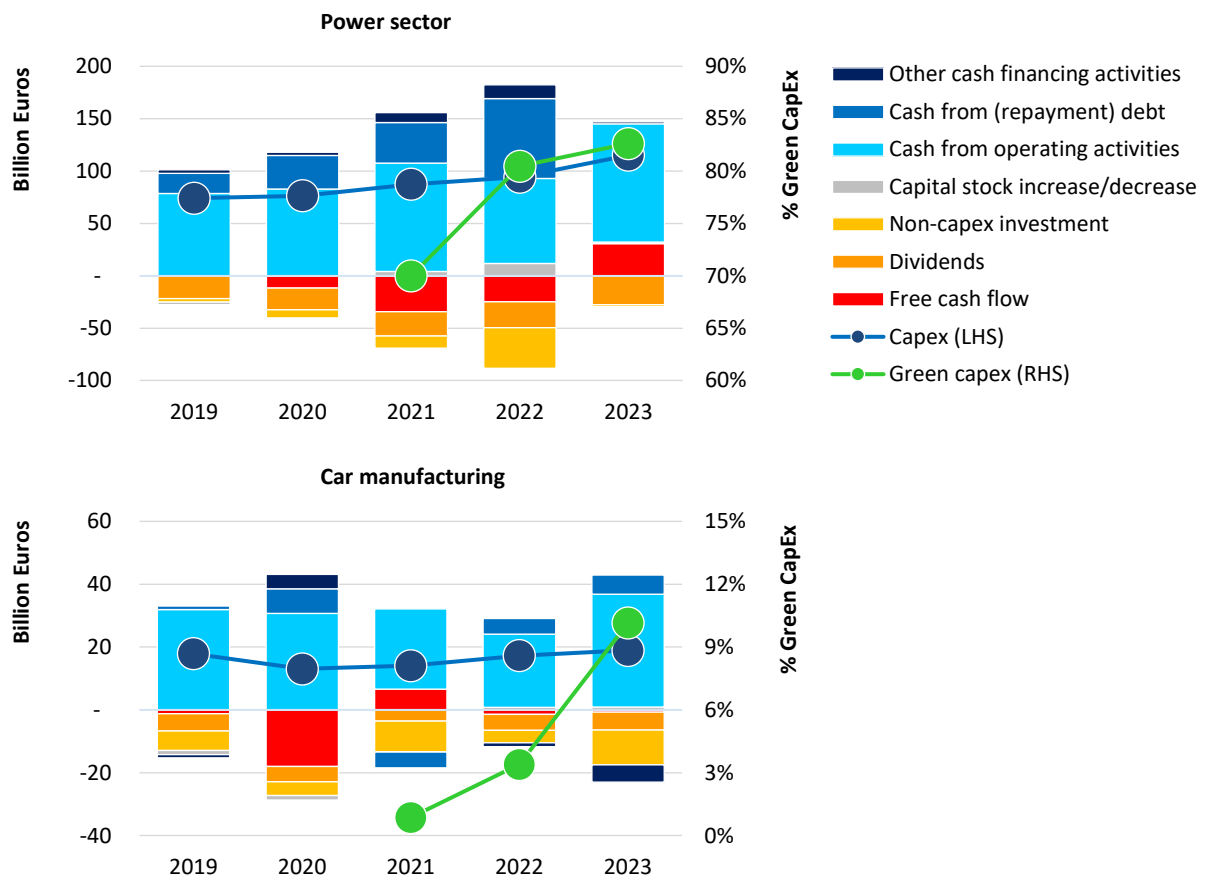


Source: Bloomberg.

The main source of CapEx financing in the power and car manufacturing sectors were cash from operating activities (Figure 42). Debt has played a somewhat different role for the two sectors: In the case of the power sector, the net debt raised from 2018-2022 also contributed to CapEx until 2023 when, at aggregate level, power utilities reduced their debt levels.

The Taxonomy-aligned Capex reported in the power sector by fiscal year end 2023 stands above 80% of total Capex,³⁶ and remains closely correlated to Capex growth seen recently. The successful transformation of the power sector included the following steps for its financing: First, use debt capacity to jumpstart transition and environmentally-sustainable investments (i.e. adjusting business models) and, in parallel, increase CapEx through Taxonomy alignment (by substituting non-aligned capex); Second, accumulate operating income out of those investments to return to a more neutral leveraging position; Third, further expand Capex levels at full alignment.

Figure 42. Cash-flow decomposition for the power and car manufacturing sectors, 2019-2023



Source: Bloomberg.

New debt contributed significantly to CapEx in the car manufacturing sector, in addition to cash from operating activities for most of the 2019-2023 period. In general, EU car companies have been cash-positive in the measured period. In terms of policy measures to increase green investments, may include switching non-

36 While analysing the available data on Capex reported through Cash Flow Statements and Taxonomy-aligned percentage and amount, some data discrepancies were noted. Occasionally, the total Capex derived from the Taxonomy-aligned reported Capex did not match the reported Capex in the Cash Flow Statement. In this section, we refer to Capex amounts as reported in the Cash Flow Statements and Taxonomy-aligned percentages as reported in non-financial reports.

Taxonomy-aligned to aligned CapEx; to increase green earnings retention; turn transition investments more profitable (possibly including tax reliefs); promote a recapitalisation of companies to enable more debt, if relevant.

Financial market dynamics

This section documents companies' financing through the lens of the different instruments reviewed in the financial market Chapter.

Power sector

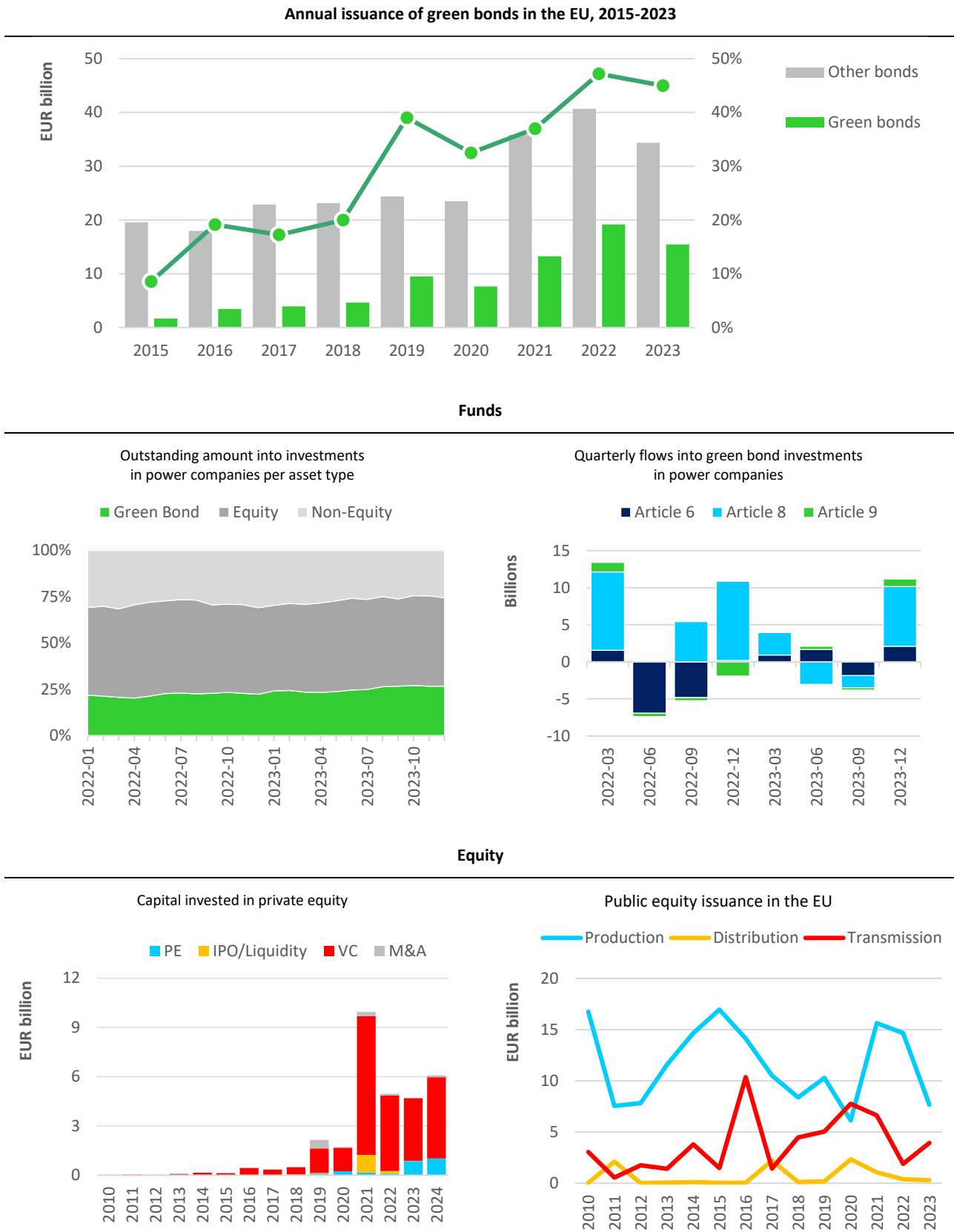
Since 2015, green bonds have emerged as a key financing instrument for the power sector. The issuance in the sector grew steadily over the last decade. In 2023, the volume of issuance levelled off after a historic surge to EUR 25 billion the year prior (Figure 43). They represented almost 45% of all bonds issued in 2023, compared to an economy-wide average of 11%. Possibly stemming from an investor demand to invest in the energy transition in line with investors own net zero commitments.

In 2023, green bond holdings represented 27% of funds' investments in the power sector, a five-percentage point increase since Jan 2022, mainly driven by SFDR Article 8 funds. The total value of investments in power sector green bonds rose from EUR 26 to 39 billion (+50%) in two years.

Equity markets are largely driven by listed NFRD companies due to their size, and notably by the subgroup of power utilities. Large sums of the capital invested in private equity targeted power sector developments. Over the last five years, the volume of equity transactions grew considerably to hit almost EUR 12 billion by October 2024, involving twice as many companies.

Public equity transactions kept relatively stable in recent years despite a fair degree of volatility, induced by the capital raised for power production projects in a heavily concentrated market. Grid systems also have a higher degree of public ownership where public equity is not an option to the same degree as for other sub-sectors of the power sector. Noteworthy, the transactions related to transmission network enhancements were boosted by renewed policy prioritisation and the need to foster electrification in Europe. According to the Commission's European Grid Action Plan, published in November 2023, EUR 584 billion in network investments will be needed by 2030 to meet growing electricity demand. Nonetheless, other instruments (e.g. green bonds) were favoured by power and grid operators over public equity to finance their developments.

Figure 43. Financing patterns of power investments



Sources: Dealogic DCM, Orbis (green bonds, public equity), ESMA, Morningstar (funds), PitchBook Data, Inc (private equity). Energy sectors at NACE2 class level. All 3 sample sectors present: 35.11, 35.12, 35.13. Only matched companies through Orbis are represented.

Car manufacturing

The emergence of green bond issuance in the car manufacturing sector dates back to 2020, with volumes established at EUR 2 billion.³⁷ In 2023, green bond issuance picked up to reach EUR 5 billion euro (16% of total issuance in the sector) (Figure 44). Green bonds still provide financing for only a portion of the EUR 41 billion in Taxonomy-aligned CapEx. Green bonds (and EU GBS) are likely to gain momentum among investors as greener projects expand in the sector.

Funds' appetite for car manufacturers' green bonds are growing, albeit starting from a low base. In January 2024, green bonds accounted for 9% of their investments in the car manufacturing space (mostly Art.8 fund portfolios), a five-percentage point increase in two years, for a total value of EUR 7.7 billion.

Following a high point in 2021, during which over 200 companies raised EUR 12 billion in private equity investments, the market has subsequently declined to EUR 5 billion, including approximately 150 companies. This general downturn in private equity/venture capital market has been triggered by geopolitical instability, increased interest rates, but also stronger competition with other fast-growing sectors such as Artificial Intelligence.

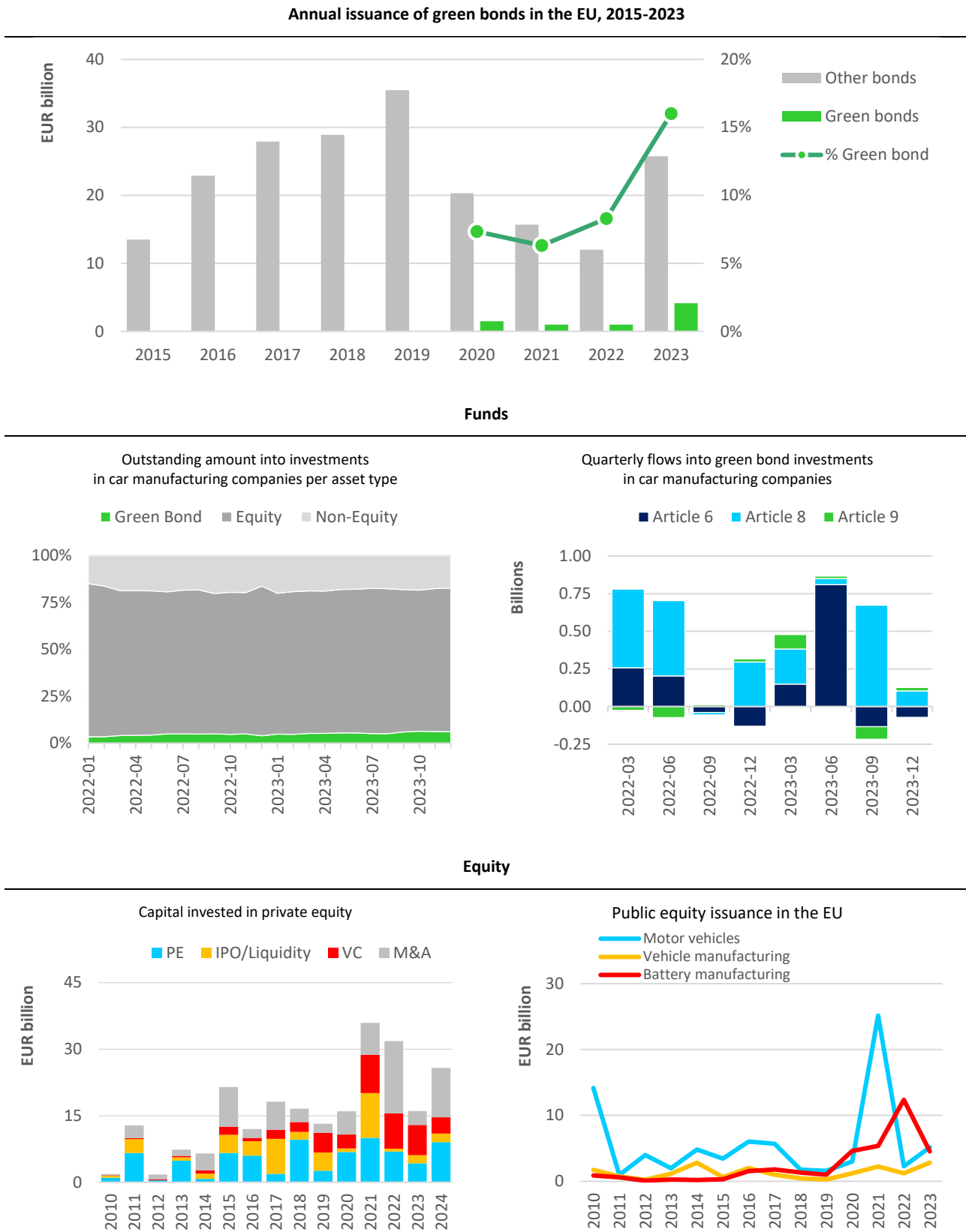
A lot of volatility also characterised public equity transactions in this sector in the last 3 years, driven by a few large IPOs. The capital raised in both car and battery manufacturing stood at EUR 5 billion by end 2023. The bulk of new capital and the biggest tickets were raised by large NFRD companies, with full or partial government ownership.

Round up

This section showcased how sectoral elements of the monitoring framework can be grouped to provide a more detailed sectoral perspective. Equivalent analysis could potentially be applied to other sectors or groups of sectors (e.g. key sectors for EU climate and competitiveness goals such as hard-to-abate sectors and the construction sector; more service-oriented professional activities), although more data on activities that are partially aligned with the Taxonomy would provide better insights for this type of analysis.

³⁷ The representation of companies from the car manufacturing sector – otherwise large size-wise globally – is lower than average in the sample. As a result, the volume of total and green bonds compiled for this analysis are likely underestimated.

Figure 44. Financing patterns of investments in car manufacturing



Sources: Dealogic DCM, Orbis (green bonds, public equity), ESMA, Morningstar (funds), PitchBook Data, Inc. (private equity). Only matched companies through Orbis are represented.

Low-carbon and affordable electricity are indispensable for a sustainable and competitive future in Europe. The power sector is well engaged in its transition, with clarity on the direction of travel for operators and investors alike. The importance of the sector in the EU transition and the urgent need to scale up investments give ground for a regular stocktake of the power developments, which could be integrated in other Commission-led initiatives (e.g. periodical Electricity Market analysis). Of particular interest: linking actual measurable investment decisions to policy progress needed to circumvent obstacles to scale up, such as red tape, load management with large variable production capacities, lack of regional integration of power grids preventing the harmonisation of electricity prices, as well as regulatory complexities.

The extent of power sector investments made in Europe, characterised by high levels of Taxonomy-alignment, are well captured by the monitoring framework. The power sector is also well represented among companies with elements of credible transition plans. Investment in this sector is poised to increase with rising electricity needs.

From a financing perspective, the power sector has financed its recent growth mainly through internally generated cash flow and lending. But with elevated debt levels, any increase in investment levels will have to come from increased revenues and internal cash flow, unless more equity is issued. The energy sector is the largest emitter of green bonds in the real economy, and an important recipient of green lending. Private equity financing has increased dramatically since 2019, signalling an appetite for investing in new low-carbon technologies in the power sector.

Car manufacturing also contributes significantly to European transition but offers a slightly more contrasted picture than the power sector. The sector is also facing acute competition globally, prompting the transformation of business models and supply chains (incl. in terms of domestic battery manufacturing). An orderly transition, reflecting the sector's maturity to absorb green capital, and innovation prioritisation are of the essence.

Higher proportions of non-Taxonomy-aligned CapEx leaves greater potential for more sustainable investments. A total of EUR 80 billion in non-Taxonomy-aligned CapEx was identified from companies with elements of credible transition plans, paving the way for a fostered transition in the sector.

Overall debt levels and profitability have come down slightly in the sector, leaving little room for further debt increase. However, the significant amount of Taxonomy-aligned CapEx points to a potential shift towards an uptake in green debt and through larger green bond issuance, which stands at only EUR 5 billion (Taxonomy-aligned CapEx amounted EUR 41 billion in 2023). The strong downturn on private equity markets over the last two years could hamper the deployment of new technologies in the European mobility sector. Listed companies in the sector do not resort to public equity. Nonetheless, only few companies recently undertook IPOs. Capital raising could flip as market conditions improve.

CONCLUSIONS

This first implementation of a framework to measure capital flows to sustainable investments, highlights the value of combining regulatory and market data to gain policy relevant insights about the state of play for transition investments in the EU. The nascent state of sustainability data reporting and the limited scope of corporate and financial data is acknowledged. From an investor's perspective, real economy data provides useful insights on, for example the future destination of transition investments, the appetite for EU Green Bonds and financial products under a revised SFDR that may include a transition category.

Significant corporate investment volumes support the transition, but more is needed. Sustainable investment data from a subset of large companies shows overall Taxonomy-aligned CapEx at EUR 250 billion, with an additional EUR 206 billion invested by companies with elements of credible transition plans. This could be related to, but not directly compared with, the total investment need at about EUR 1.5 trillion on average over 2030-2050. Taxonomy-aligned CapEx (mainly its enabling component) is growing significantly, up 34% from 2022. This confirms the momentum behind the EU transition.

The power and car manufacturing sectors are leading the way in the transition, accounting for two-thirds of Taxonomy-aligned investments in 2023, but with important differences. The main part of CapEx from power sector companies with elements of credible transition plans is Taxonomy-aligned, pointing to the maturity of transition in the sector. By contrast, only a third of car manufacturers' Capex is Taxonomy-aligned. The goods produced by this and other segments of the EU manufacturing sector are critical enablers of the transition and of the bloc's competitive position. The remaining third of Taxonomy-aligned CapEx is spread across other economic sectors. Technological and regulatory hurdles prevent the uptake of sustainable investments in, for example hard-to-abate industries and real estate. These sectors deserve further scrutiny including in terms of innovation financing.

Companies' internally generated capital is the main source of financing for their transition investments.

External financing is mainly driven by green or other debt financing. Annual *flows* of green bond issuance lie around EUR 200 billion per year, half of which is being issued by the private sector. The estimated *stock* of green financing volumes outstanding in the EU through primary markets instruments (green loans and green bonds) amounted to EUR 1.69 trillion as of the end of 2023. Outstanding green loans, although underestimated, is 30% higher than outstanding green bonds, while total outstanding loans is three times outstanding green bonds in the EU. There is potential to increase banks' green lending to support the transition.

While debt financing is the main source of finance in terms of volume, the importance of new equity should not be underestimated in driving green tech innovation and boosting investments that may be less suitable for debt financing, but critical for the competitiveness of clean tech companies. Over the past years, private

equity has become a steady source of funding for green tech innovation. Green private equity investments reached a peak in 2021 at EUR 50 billion, before slowing down in 2022 and 2023 to stay above EUR 30 billion. Green public equity investments – still lacking a universal definition – are expected to play a growing role for EU companies in the coming years. They amounted to EUR 349 billion over the period 2010-2024, well below cumulative levels observed in the US and other key jurisdictions. On top of funding transition efforts of listed companies through equity follow-on issues, public markets will also provide an exit to private equity/venture capital-owned green investments, incentivising the development of the private equity market.

The relatively high debt leverage ratios of large companies indicates that access to debt financing is not a key constraint to transition investments as long as the commercial risk is unchanged.³⁸ A predictable policy environment that ensures long term profitability of transition projects would likely increase the pace of transition investments and strengthen EU's green competitiveness.

The significant regional imbalances in accessing green debt and equity highlights the importance of establishing a Savings and Investment Union to accompany the growth of EU companies contributing to EU climate objectives. Green and transitional investments and financing are the most developed in Western and Northern Europe, and to a lesser extent Southern Europe. Sustainable finance remains inadequately developed in Central and Eastern Europe, posing a significant barrier to transition in that region and warranting greater focus from policymakers.

Efforts to improve the competitiveness of EU companies should aim to preserve the positive progress achieved with the EU Taxonomy, while simplify its use. The EU Taxonomy disclosures have granted unprecedented insights into the sustainability of the economic activities and greenness of EU companies' capital investments. Recent figures on Taxonomy-aligned CapEx show that a broader greening of the EU economy is underway, a view that the strength of the EU green bond market also supports. The establishment of a virtuous circle between Taxonomy reporting and Taxonomy-based instruments (such as the European green bond standards or, in the future, Taxonomy-aligning benchmarks) may further support this positive dynamic.

³⁸ Only 6.8% of European companies declared to be finance-constrained in 2024 (EIB, 2024c).

EXTENSIONS

The modularity of this data architecture allows for multiple extensions, the enhancement of datasets and the integration of new ones. The monitoring of trends, possible with several monitoring iterations offers great potential to measure progress on policy implementation and adjustments over time.

Future developments on sustainable investments

- Address current methodological limitations (*Methodology Report, Annex 4*), and data coverage in terms of scope and quality (*Annex A1*)
- More granular decomposition of regulatory data and Taxonomy alignment by objective
- Improve sector identification: leveraging on the new NACE Rev 2.1 classification to better identify key sectors for the green transition and incorporating granular activity-level data as companies mature and reporting becomes more harmonised.
- Strengthen framework on global financial markets and international capital flows
- Extend analysis to environmental objectives beyond climate change
- Develop a more activity-based approach instead of relying solely on the company's main activity to determine e.g., its Taxonomy-aligned CapEx
- Document sectoral OpEx when relevant, provided that a more concise and applicable definition is established.

Broadened scope of investments

- Integrate household expenditures (e.g. on electric vehicles, energy-efficient renovations). The current framework captures some household expenditures through financial channels like bank loans (reported under the Green Asset Ratio)
- Integrate public sector investments and public procurements for private purchases
- Integration of 'brown flows'
- Social dimensions of the transition
- Simplified representation of SMEs' investments which account for 99% of European businesses and almost two-thirds of corporate emissions (EU Commission, 2022, 2023)

Enhancement of the transition framework

- Refine the transition tier framework to reflect advancements in regulations, science, and data availability: *scenarios and targets*, using feasible scenarios with minimal environmental and social risks to

enhance target credibility; *objectives*, expanding assessments to include just transition, nature (Do No Significant Harm), and adaptation; *holistic transition plans*, transitioning from a climate-only focus to frameworks covering environmental objectives and social dimensions.

Assess progress on specific policy objectives such as the Clean Industrial Deal

- Track the roll-out of clean tech manufacturing capacities in Europe, at the heart of the EU Clean Industrial Deal with objective to bring about decarbonisation and industrial competitiveness. A preliminary mapping of Taxonomy-aligned CapEx with activities relevant to the Net Zero Industry Act is introduced in Annex A5.

Eligibility gap assessment

- Determine CapEx volumes outside the EU Taxonomy with potential to support the transition.³⁹

³⁹ According to a preliminary estimate from the Platform *Data Science Hub*, the total CapEx volume that is currently not eligible amounts to EUR 660 billion, out of which EUR 60 billion stem from significantly harmful sectors (i.e. oil, coal and tobacco).

REFERENCES

- Accenture (2022), *The chemical industry's road to net zero: Costs and opportunities of the EU Green Deal*.
- Alessi, L., Cojoianu, T., Hoepner, A. G. F., & Michelon, G. (2024), *Accounting for the EU Green Taxonomy: exploring its concept, data and analytics*, *Accounting Forum*, 48(3), 365–373.
- Draghi, M. (2024), *The future of European competitiveness - A competitiveness strategy for Europe*, EU Commission.
- ECB (2025). *Investing in Europe's green future, Green investment needs, outlook and obstacles to funding the gap*, Occasional Paper Series No. 367, ECB.
- ECB (2023), *Financial Stability Review*, May 2023.
- Eccles, R.G., Shandal, V., Young, D., Montgomery, and B. (2022), *Private equity should take the lead in sustainability*, *Harvard Business Review* (July-August 2022).
- EIB (2024a), *Investment Report 2023-2024, Transforming for competitiveness*.
- EIB (2024b), *Advancing sustainable finance in Central, Eastern and South-Eastern Europe*.
- EIB (2024c), *EIB Investment Survey 2024, European Union Overview*.
- EIB (2025), *EIB Group Investment Report 2024/2025*.
- EU Commission (2018), *Action Plan: Financing Sustainable Growth*, COM (2018) 97 final, EU Commission, Brussels
- EU Commission (2021), *Strategy for Financing the Transition to a Sustainable Economy*, COM (2021) 390 final, EU Commission, Brussels.
- EU Commission (2022), *Annual Report on European SMEs 2021/22, SMEs and environmental sustainability*, Background document, SME Performance Review 2021/2022.
- EU Commission (2023), *Commission Recommendation (EU) 2023/1425 on facilitating finance for the transition to a sustainable economy*, 27 June 2023.
- EU Commission (2024a), *EU Climate Action Progress Report 2024*, COM (2024) 498 final.
- EU Commission (2024b), *Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable just and prosperous society*, SWD 2024 63 final.
- EU Commission (2024c), *Monitoring progress towards a Capital Markets Union: a toolkit of indicators, Overview of CMU Indicators – 2024 update*, CWD (2021)544, based on Invest Europe activity data, July 2024 update.
- EU Commission (2025), *A Competitiveness Compass for the EU*.
- EU Platform on Sustainable Finance (EU PSF) (2025a), *Simplifying the EU Taxonomy to Foster Sustainable Finance Report on Usability and Data*.

EU Platform on Sustainable Finance (EU PSF) (2025b), *Building Trust in Transition: Core Elements for Assessing Corporate Transition Plans*.

Eurostat (2025), *Investment in climate change mitigation 0.55% of GDP*, News article 21 January 2025.

International Capital Market Association (ICMA) (2022), *Green Bond Principles Voluntary Process Guidelines for Issuing Green Bonds*.

International Energy Agency (IEA) (2023), *IEA-ECB-EIB High-Level International Conference, Ensuring an Orderly Energy Transition: Europe's competitiveness and financial stability in a period of global energy transformation*, Background Document, 29 September 2023, IEA, Paris.

Letta E. (2024), *Much more than a market – Speed, Security, Solidarity, Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*.

Ma M. (2025), *Climate Tech Funding Fell 40% in 2024 as Investors Rushed to AI*, Bloomberg News, 30 Jan. 2025.

Morningstar Sustainalytics (2024), *EU Taxonomy Reporting Review*, 18 October 2024.

NZAOA (2024a), *NZAOA Target-Setting Protocol Fourth Edition*, April 2024

NZAOA (2024b), *Net Zero Asset Owner Alliance 2024, Progress Report*, United Nations Environment Programme Finance Initiative, October 2024.

NZBA (2024), *Net-Zero Banking Alliance 2024 Progress Report*, United Nations Environment Programme Finance Initiative, October 2024.

Official Journal of the European Union (OJ) (2019), *Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector*, OJ L 317, 9.12.2019, p. 1–16.

Official Journal of the European Union (OJ) (2020), *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088*, PE/20/2020/INIT, OJ L 198, 22.6.2020, p. 13–43.

Official Journal of the European Union (OJ) (2023a), *Regulation (EU) 2023/2631 of the European Parliament and of the Council of 22 November 2023 on European Green Bonds and optional disclosures for bonds marketed as environmentally sustainable and for sustainability-linked bonds*, PE/27/2023/REV/1, OJ L, 2023/2631, 30.11.2023.

Official Journal of the European Union (OJ) (2023b), *Commission Recommendation (EU) 2023/1425 of 27 June 2023 on facilitating finance for the transition to a sustainable economy*, C/2023/3844, OJ L 174, 7.7.2023, p. 19–46.

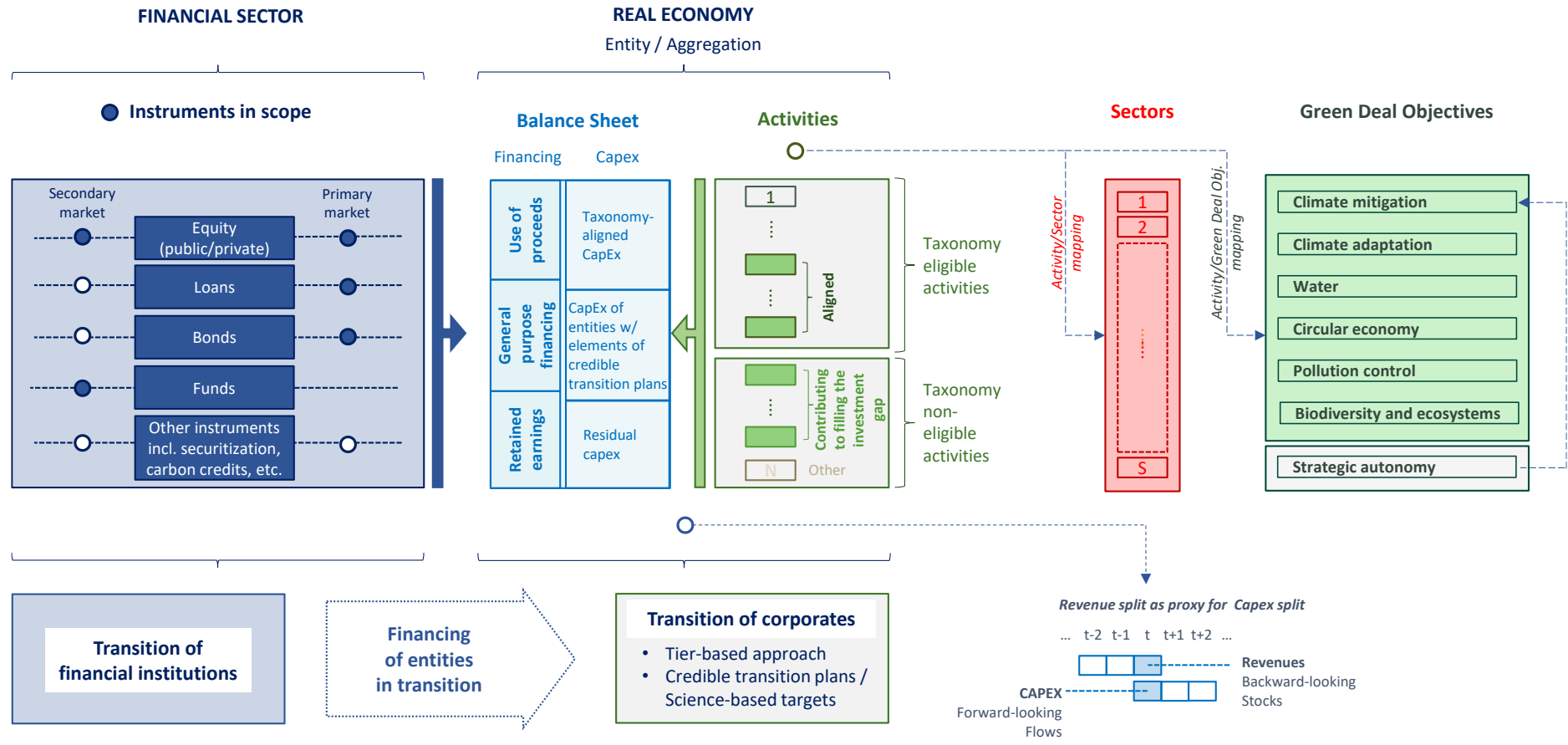
Pisani-Ferry J., Tagliapietra S. (2024), *An investment strategy to keep the EU Green Deal on track*, Bruegel.

Tylenda E. et al. (2024), *Latest Green Revenue & Green Capex shows Significant Growth in Second Year*, SUSTAIN: EU Taxonomy Monitor, Goldman Sachs Equity Research, 28 May 2024.

von Der Leyen, U. (2024), *Europe's Choices, Political Guidelines 2024-2029 for the next European Commission 2024-2029*.

Annexes

A1. Schematic representation of the conceptual framework



A2. Data quality in reporting taxonomy data

Taxonomy reporting has become available in 2024 for the years 2022 and 2023, with companies within the NFRD scope due to report. The analysis conducted by the Platform leverages on this initial reporting to build the monitoring framework. For this data, providers are fully reliant on companies' reporting. This means that no quality check nor harmonisation has been done.

When analysing reported data, we have identified several limitations:

- 1) First, no data is available for all companies that should be reporting. Within the NFRD scope of 1878 companies, no taxonomy-related data was available for 540 companies, at the beginning of October 2024 for the year 2023 (28.7%). This could be explained by a lack of reporting by companies that are obliged to report under the regulation, as well as by some missing companies in the data providers universe. Moreover, reporting data does not mean reporting positive amounts. Indeed, only 1183 NFRD companies reported non-zero eligible CapEx, and only 643 reported non-zero aligned CapEx.
- 2) Beyond general data on eligibility and alignment, very little data is available regarding the allocation of such CapEx across different taxonomy objectives.
- 3) Moreover, given the absence of a standardised framework for reporting on group-level data, each company's methodology may differ. This can lead to double counting when both the parent company and the subsidiary reports. Due to the varying approaches used by companies, at the moment it is not possible to systematically identify and account for these instances, as it would require engaging with each one case by case. Companies do not always provide the details on the scope on which they are reporting, hence data providers do not collect such information. In our analysis, around 7% of observations are potentially affected by double counting, with both parent companies and subsidiaries reporting. Companies in this sub-sample report a total of EUR 68 billion of aligned CapEx, hence 25% of total aligned CapEx in 2023. Hence, our estimate of total aligned CapEx might be slightly overestimated but keeping only parent companies might lead to an underestimation of total aligned CapEx, as their group-level taxonomy reporting should follow "*the same consolidation principles that apply to the group[s'] financial reporting under the applicable accounting principles*".⁴⁰ Therefore, no more precise estimation can be done with the data currently available.

⁴⁰ https://finance.ec.europa.eu/system/files/2022-01/sustainable-finance-taxonomy-article-8-report-eligible-activities-assets-faq_en.pdf

- 4) Last, we have identified that companies do not consistently report on their capital expenditure between their financial and non-financial reporting, leading to inconsistencies. Hence, in the transition section, the total CapEx computed as part of the eligibility and alignment reporting cannot be compared to total CapEx reported by companies as part of their balance-sheet reporting. Therefore, we derive total CapEx from the share and monetary amounts of eligible CapEx reported by companies to ensure comparability. When computing non-aligned CapEx, we use this derived total CapEx amount and subtract from it the reported Taxonomy-aligned CapEx. For companies reporting only eligible CapEx but no aligned amount, we assume that they have zero Taxonomy aligned CapEx.

Besides Taxonomy reporting, this report from SG3 has highlighted a significant data gap at the granular level that prevents a clear identification and monitoring of flows for certain sectors or certain instruments. First, common definitions of “greenness” are still missing for many instruments, such as equity. Then, some information remains confidential and cannot be tracked such as loans, preventing the monitoring of one of the main financing sources of companies in Europe. Finally, sector classifications are often not harmonised across data sources nor in line with the sectors of interests for the green transition. The new NACE Rev.2.1 classification should improve the latter issue with dedicated sections for renewable energy, but the adoption rate of this new classification will determine the data quality improvements. In the absence of dedicated sections related to green sectors, the work of Subgroup 3 has shown the importance of the use of granular data to be as precise as possible, making data quality at micro-level a key challenge to overcome in the next years.

A3. Loans

Indicator	Details	Rationale for inclusion
Energy efficient real estate (stocks) [ESG P3 disclosure template 2]	Loans collateralised by commercial and residential immovable property, by energy efficiency level (kWh/sqm) brackets. [Expressed as a percentage of total loans collateralised by commercial and residential immovable property.] Available as of now.	Provides an overview of collateral of existing loans, presenting the 'starting point'. Changes over time could be included for the time being as the delta in stock between t and t-1 and delta in the numerator only (from the next disclosure round onwards).
Green asset ratio (GAR) (stocks) [ESG P3 disclosure template 7/8]	Loan part only of the GAR (%), broken down into the various counterparties (NFCs, FCs, HHs). Break-down of the total GAR into CCM, CCA, of which specialised, transitional/adaptation and enabling activities (as applicable) potentially possible at a later stage when disclosures become more mature. Available as of now.	Provides a proxy for sustainable lending. Focuses on financial assets funding sustainable activities as per the EU taxonomy (contributing substantially to CCM or CCA). Changes over time could be included for the time being as the delta in the ratio between t and t-1, and the change in the numerator only (from the next disclosure round onwards).
Assets not included in the GAR but in the Banking Book Taxonomy Alignment Ratio (BTAR) (stocks) [ESG P3 disclosure template 9]	Assets making up the loan part of the BTAR, to EU NFCs only. [Expressed as a percentage of total BTAR denominator assets.] Break-down into CCM, CCA, of which specialised, transitional/adaptation and enabling activities (as applicable) potentially also possible at a later stage when disclosures become more mature. Note – Data collected by banks on a voluntary basis. Available from Jun 2025 (first disclosure reference date Dec 2024).	The GAR in its nominator only covers lending to NFCs s.t. to NFRD disclosure obligations. SMEs (not s.t. NFRD) make up a substantial portion of the EU corporate landscape and are of relevance for banks' B/S ⁱⁱⁱ . Hence the assets not covered by the GAR would present an important complementary indicator, and at the same time inclusion would ensure setting the right incentives for banks. Changes over time could be included for the time-being as the delta in the ratio between t and t-1, and the change in the numerator only.

<p>Loans funding climate change activities not covered in the GAR or BTAR (stocks)</p> <p>[ESG P3 disclosure template 10]</p>	<p><i>Loan exposures that are not taxonomy aligned according to the GAR indicators but that still support counterparties in the transition and adaptation process for the objectives of climate change mitigation (loans issued under standards other than EU standards). Counterparty sector break-down (FC, NFC, HHs). The type of risk mitigated (transition vs physical) potentially possible at a later stage when disclosures become more mature. [Expressed as a percentage of total lending.]</i></p> <p><i>Available as of now.</i></p>	<p><i>Captures banks' activities that are directed at (climate-related) sustainable objectives but that are not captured by the GAR as not fully taxonomy - aligned. Complements the estimation of banks' green loan books beyond EU taxonomy alignment. Changes over time could be included for the time-being as the delta in stock and the numerator between t and t-1 only (from the next disclosure round onwards).</i></p>
--	--	--

Confidential - PS

A4. Metrics for the transition of financial institutions

Indicators from Template 3

IEA Net Zero Sectoral Alignment metrics

- The deviation (%) of financed emissions from IEA NZ scenarios per NACE sectors. Only available for high-impact sectors (real estate and financial sectors not included):
Power; Fossil fuel combustion; Automotive; Aviation; Maritime transport; Cement, clinker and lime production; Iron & steel, coke and metal ore production; Chemicals; "Potential additions relevant to the business model of the institution".
- Shows how portfolios' financed emissions align or not to net-zero scenarios.

Available from Dec 2024 (first disclosure reference date Jun 2024).

IEA Net Zero Average Alignment metrics

- Weighted average deviation (%) for the high-impact sectors reported.
- Provides a general sense of banks' transition progress, as an addition to the more granular indicators coming from the metric describe above.

Available from Dec 2024 (first disclosure reference date Jun 2024).

Indicators from the combination of Templates 1 and 3

Climate targets

% coverage of financed emissions

+ Top 3 sectors not covered

- Matching T3 sectors with targets on financed emissions (T1 col. i).
Share of financed emissions covered by transition targets = Sum of these emissions / Total financed emissions (T1 I 53).
Top 3 sectors not covered by T3. Top 3 emitters as shares of total financed emissions.
- Provides a sense of how material targets are in terms of coverage, and in turn how likely is the overall portfolio to transition.

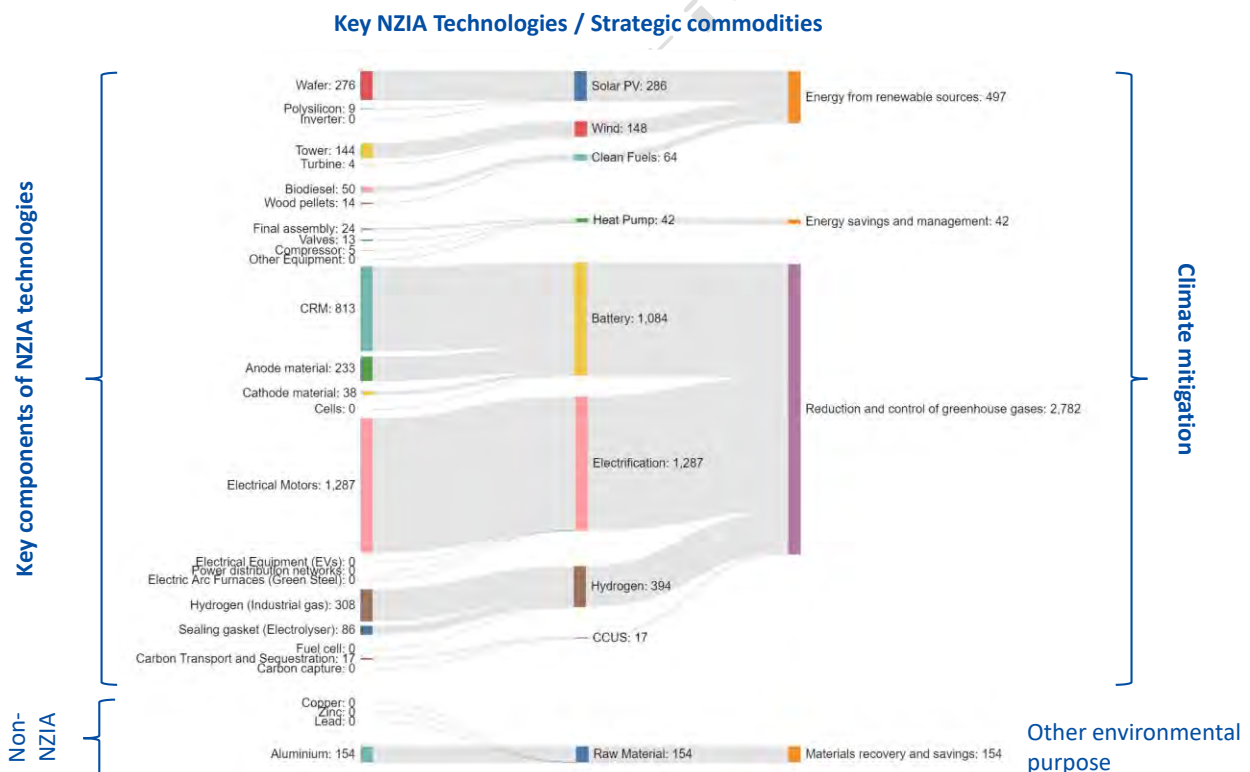
Available from Dec 2024 (first disclosure reference date Jun 2024).

A5. Tracking progress in clean tech manufacturing

The transition and scale up of EU’s clean tech sector and the implementation of the Critical Raw Materials Act are amongst priority orientations of the Clean Industrial Deal. The monitoring framework can be applied to the assessment of progress towards these policy objectives.

In a first attempt, a mapping of NACE sectors (at 4-digit level) relevant to the clean tech manufacturing sector was undertaken, in line with the strategic technologies and some of their key components identified in the Net Zero Industry Act (NZIA). This allows for the selection of entities operating in clean tech supply chains and the consolidation of associated Taxonomy-aligned CapEx. These capital flows can in turn be linked to specific environmental purposes, as defined by the UN Statistical Commission, for a comprehensive overview of capital flows directed to clean tech supply chains (Figure 45). This approach paves the way for the measurement of progress towards the greening of European supply chains and open strategic autonomy goals. A key limitation of this bottom-up approach lies with the lack of granularity of some Taxonomy-eligible activities in the manufacturing sector, and the difficulty to isolate CapEx relevant to specific NZIA components. More work is needed to identify accurately the relevant businesses operating in this space.

Figure 45. Breakdown of Taxonomy-aligned CapEx by strategic technology and environmental purposes.



Notes: Flow widths are proportional to the volume of Taxonomy-aligned CapEx, here expressed in million EUR. Activities selected from an activity tree provided by the Platform Data Science Hub.

Source: Own calculations based on Bloomberg, Orbis and UN Statistical Commission (March 2024), *Classification of Environmental Purposes*; [European environmental economic accounts: Technical note](#) (April 2024).

Acknowledgements

Lead authors

Organisation	Name
European Investment Bank (EIB)	Bertrand Magné
Skandinaviska Enskilda Banken (SEB)	Karl-Oskar Olming
Skandinaviska Enskilda Banken (SEB)	Alva Jonevret

Chair

Organisation	Name
Comisión Nacional del Mercado de Valores (CNMV)	Helena Viñes Fiestas

Other lead contributors (in alphabetical order)

Organisation	Name
Bloomberg L.P.	Annie Walsh
Euronext	Camille Leca
European Stability Mechanism (ESM)	Carlos Martins
European Central Bank (ECB)	Egle Rocco
University College Dublin (UCD)	Fabiola Schneider
European Securities and Markets Authority (ESMA)	Federico Piazza
Joint Research Centre (JRC)	Giacomo Cotignano
CDP	Hélène Procoudine-Gorsky
European Securities and Markets Authority (ESMA)	Julien Mazzacurati
European Banking Authority (EBA)	Katrin Weissenberg
FISMA	Mariana Tomova
Joint Research Centre (JRC)	Mélina London
Sustainable Finance Observatory	Nicola Koch
Euronext	Thibaud Laval

Rapporteurs

Organisation	Name
Orgalim / TWG	Andreas Brunsgaard
EPA Network / TWG	Astrid Matthey
European Investment Bank (EIB) / SG 3	Bertrand Magné
AXA / SG 1	Clémence Humeau
UNEP FI / SG 1	Elodie Feller
Skandinaviska Enskilda Banken (SEB) AB (publ) / SG 3	Karl-Oskar Olming

Members

Organisation	Name
Agent Green	Theodor F. Cojoianu
Allianz SE	Jörg Ladwein
AXA	Clémence Humeau
BusinessEurope	Erik Berggren
CBI	Sean Kidney
CDP	Hélène Procoudine-Gorsky
European Alliance for Sustainable Finance in waste management and recycling	Daniel Houska
EPIA SolarPower Europe / ENEL	Giulia Genuardi
Eurochambres	Karolina Opielewicz
Eurometaux	Mukund Bhagwat
European Banking Federation	Johannes Petrus Maria (Hans) Biemans
ISFC	Linda Zeilina
Natural Resource Institute Finland	Esa-Jussi Viitala
Orgalim	Andreas Brunsgaard-Jorgensen
Skandinaviska Enskilda Banken (SEB)	Karl-Oskar Olming
SMEunited	Gerhard Huemer
Sustainable Finance Observatory	Nicola Koch
Sustainalytics	Anne Schoemaker
Water Europe	Gonzalo Delacámara
Type A	Agnieszka Slomka-Golebiowska
Type A	Andreas Hoepner
Type A	Camille Leca
Type A	Linda Romanovska
Type A	Bernabe Alonso Farinas
Type A	Enrico Benetto
Type A	Ottorino Morresi
Type B	Marie Baumgarts

Directly appointed members

Organisation	Name
EU Agency for Fundamental Rights (FRA)	Adrianna Bochenek
European Banking Authority (EBA)	Ali Erbilgic
European Banking Authority (EBA)	Fabien Le Tennier
European Environment Agency (EEA)	Andreas Barkman

European Insurance and Occupational Pensions Authority (EIOPA)	Pamela Schuermans
European Investment Bank (EIB)	Aldo Romani
European Investment Bank (EIB)	Nancy Saich
European Investment Bank (EIB)	Bertrand Magné
European Investment Fund (EIF)	Merilin Horats
European Securities and Markets Authority (ESMA)	Angeliki Vogiatzi
Type A	Eila Kreivi

Observers

Organisation	Name
Bloomberg L.P.	Nadia Humphreys
Business and Science Poland	Łukasz Błoński
Cassa Depositi e Prestiti SpA	Gaia Ghirardi
CEFIC	Liesbeth Timmermans
European Central Bank (ECB)	Matthias Rau-Goehring
European Bank for Reconstruction and Development (EBRD)	Maya Hennerkes
European Financial Reporting Advisory Group (EFRAG)	Kerstin Lopatta
European Financial Reporting Advisory Group (EFRAG)	Saskia Slomp
European Network of the Heads of Environment Protection Agencies (EPA Network)	Natalie Glas
EPA Network / TWG	Astrid Matthey
European Stability Mechanism (ESM)	Carlos Martins
European Stability Mechanism (ESM)	Niyat Habtemariam
European Trade Union Confederation (ETUC)	Marco Cilento
Organisation for Economic Co-operation and Development (OECD)	Raphaël Jachnik
Principles for Responsible Investment (PRI)	Elise Attal
SGI Europe	Filippo Brandolini
UN Environment Programme Finance Initiative (UNEP FI)	Elodie Feller
World Green Building Council (WGBC)	Julie Emmrich

External contributors

The report has benefited from comments from the following participants to the external consultation process (in alphabetical order): Alice Anders (UNEP FI), Jesica Andrews (UNEP FI), Tanguy de Bienassis (IEA), Timo Busch (University of Hamburg), Clara Calipel (I4CE), Xavier Coeln (French Treasury), Johanna Dichtl (UNEP FI), Matteo Ferrazzi (EIB), Pierre Garrault (European Sustainable Investment Forum), Fotios Kalantzis (EIB), Shahin Kazemzadeh (UNEP FI), Sarah Kemmitt (UNEP FI), Justin Kew (Balyasny Asset Management), Johannes Kleibl (ECB), Jolien Noels (OECD), Matilda Persson (Nordea), Malgorzata Osiewicz (ECB), Siri Sachs (SEB), Nuno Silva (ECB), Cecila Tam (IEA), Evan Tylanda (Goldman Sachs), Marcin Wolski (EIB), Markus Zimmer (Allianz).

With special thanks to Barbara Gabor (FISMA), Elizabeta Gal (FISMA), Silvia de Iacovo (FISMA), Diarmuid Murphy (FISMA), and Rostislav Rozsypal (FISMA) for their support and guidance.

The views expressed in this report should not be interpreted as stemming from these institutions.