TheCityUK

In partnership with BNP PARIBAS
The bank for a changing world

# Green finance:

## A quantitative assessment of market trends

Data supplied by: REFINITIV

# About TheCityUK

TheCityUK is the industry-led body representing UK-based financial and related professional services. We champion and support the success of the ecosystem, and thereby our members, promoting policies in the UK, across Europe and internationally that drive competitiveness, support job creation and ensure long-term economic growth. The industry contributes over 10% of the UK's total economic output and employs more than 2.3 million people, with two thirds of these jobs outside London. It is the largest tax payer, the biggest exporting industry and generates a trade surplus exceeding that of all other net exporting industries combined. It also makes a real difference to people in their daily lives, helping them save for the future, buy a home, invest in a business and protect and manage risk.

# About BNP Paribas

BNP Paribas is Europe's leading bank and key player in international banking and has been present in the UK for more than 150 years as a long-term partner to British business. The BNP Paribas Group in the UK is formed of 10 divisions and employs over 9,000 staff based in 21 core locations across the country. The bank helps clients achieve their goals by combining local know-how and global reach and seeks to make a positive, sustainable contribution to both the UK economy and society.

https://www.bnpparibas.co.uk/en/who-we-are-uk/

# Green finance in numbers

THE **GREEN FINANCE MARKET** HAS GROWN FROM **$5.2BN** IN 2012 TO

**$540.6BN**

**IN 2021**

**GREEN BONDS** ACCOUNTED FOR FULLY

**93.1%**

OF TOTAL **GREEN FINANCE GLOBALLY** OVER 2012-21

**GLOBAL GREEN BOND** ISSUANCE INCREASED FROM **$2.3BN** IN 2012 TO

**$511.5BN**

**IN 2021**

**UK GREEN BOND** ISSUANCE GREW FROM **$1.1BN** IN 2012 TO

**$37.4BN**

**IN 2021**

THE **UK FINANCIAL SECTOR** ISSUED

**$28.9BN**

WORTH OF **GREEN BONDS** OVER THE PAST DECADE

OVER THE **PAST DECADE** **23** **UK COMPANIES** RECEIVED **GREEN PRIVATE EQUITY INVESTMENT** AND **28 UK PRIVATE EQUITY INVESTORS** INVESTED IN **GREEN BUSINESS**

**EUROPE** ACCOUNTED FOR AROUND

**50%**

OF **GLOBAL GREEN LENDING** OVER 2017-21

THERE WERE

**129**

**GREEN IPOS GLOBALLY** OVER 2012-21

# Contents



# Foreword - TheCityUK

The growth of green finance has had many hurdles to overcome in recent years. Some of these are long-standing, like a lack of awareness of products and services among consumers and market participants, and the well-recognised challenge of the lack of standardised definitions of what constitutes 'green'. In addition, the world has had to contend with severe, unexpected shocks: the Covid-19 pandemic, supply-chain disruptions affecting global prices for goods and services, and now the conflict in Eastern Europe.

All of these had—and have—the potential to de-emphasise green finance and its role in helping to ensure that the world meets the commitments made in the Paris Agreement of 2015, and that countries such as the UK that have committed to net-zero carbon emissions targets achieve those targets. The current conflict in Eastern Europe in particular is likely to re-emphasise energy security, potentially at some cost to efforts to make energy supplies more environmentally friendly. However, these short-term crises do not diminish the long-term climate crisis. Moreover, the continued development of alternative energy sources means that energy security and green energy are not necessarily mutually exclusive (indeed, they may be mutually reinforcing to some extent). So the need to finance the transition to a greener economy remains undiminished.

Our new research quantifying green finance over the past decade (2012-21) is the first of its kind, and also TheCityUK's first research in this area since its trio of green finance reports produced in collaboration with Imperial College Business School's Centre for Climate Finance & Investment (2017-19). Given the impossibility of precisely quantifying green finance flows, it is indicative rather than comprehensive, but it nevertheless represents a landmark attempt to assess in quantitative terms the amount of green finance activity over the past ten years; trends in various market segments (green bonds, green IPOs and green private equity, including green venture capital); and the scale of such activity in various markets, using both absolute and relative measurements (to adjust for the fact that all other things being equal, countries with larger capital markets and more financing activity overall will tend to have more green finance activity).

Our key findings will not come as a surprise. For example, green finance—using our definition—has grown rapidly from a low base, rising from $5.2bn in 2012 to $540.6bn in 2021. Nevertheless, it remains a very small part of overall financing activity, representing less than 2% of total finance (on a like-for-like basis) over 2012-21 cumulatively. Green bonds account for almost the entirety of green finance. Sovereign green bond issuance seems to spur private-sector green bond issuance. And US and China—the world's two largest economies by a huge margin, and both with extremely large financial markets—dominate green finance markets by virtue of the sheer scale of their financing offerings.

Notwithstanding the severe challenges of quantifying green finance, this report is an attempt to measure and to objectively assess the state of green finance globally; it does not attempt to rank countries according to green finance activity. In this way, its goal and approach differ significantly from other research in this area. The Global Green Finance Index, for example, offers geographical rankings but measures perceptions of green finance hubs as much as actual financial flows.

Green finance continues to evolve, and to elude hard boundaries and definitions. The professional services ecosystem of legal, accounting and consulting services support green finance, but it is often impossible to disaggregate and measure their green activities. The wider environment supporting global green finance hubs includes many unquantifiable factors. For these and many other reasons, there is no single perfect way to assess green finance or green finance centres, and so we value the multiplicity of approaches and are pleased to offer this new research as an important contribution to the literature.

**Anjalika Bardalai**

Chief Economist & Head of Research, TheCityUK

# Foreword - BNP Paribas

Over the last decade, climate change has been a driving force creating a structural shift in which finance is becoming a lever for responding to the challenges facing the world around us.

The transition towards a low carbon economy requires a mobilisation of resources across the whole economy, as no sector is immune to the impact of the climate and biodiversity crisis. Global temperatures are heating at the fastest pace on record, species extinction is a reality, and recent scientific reports suggest that 40% of the world's population are vulnerable to the impacts of climate change. These crises affecting both people and planet have been a catalyst for mainstreaming green finance.

Managing climate risk, financing net zero businesses, investing in green technologies and creating a supportive policy environment through which our industry can harness its innovation capabilities to support the transition are paramount as we look ahead to the coming decade. This report takes stock of the journey so far, highlighting the breadth of product innovation, momentum of green finance within capital markets and beyond, and ultimately shows how finance can innovate for a greener economy. From green bonds and loans embedding scientific targets to the equity capital markets linking growth to sustainability, sustainable finance has a huge role to play in supporting the transition.

The UK has witnessed a surge in climate aligned capital, and London is a global powerhouse when it comes to industry expertise, innovation, and policy making. The government's 2050 net zero target has created a constructive environment for business to commit to transition, and the recent mandatory reporting of TCFD and transition plans will be further fuel for finance to support companies, investors and stakeholders across the economy in financing the net zero transition. As a bank committed to net zero, BNP Paribas' collaboration with TheCityUK on this report aims to progress the narrative on sustainable finance and evolve the debate on the tools, materiality and robustness of finance to create a greener tomorrow.

**Anne Marie Verstraeten**

UK Country Head, BNP Paribas

# Executive summary

- This report offers quantitative analysis of green finance—both green debt and green equity—over 2012-21. It contextualises the growth of green finance over the past decade and analyses green finance market trends in the UK and globally.
- The lack of commonly-agreed definitions and classification systems presents a major challenge for quantifying green finance and remains a significant barrier to progressing sustainability further within financial markets, notwithstanding ongoing initiatives including, but not limited to, work on green taxonomies. Moreover, much financing activity that could be considered green is not necessarily captured in green finance data, either because of definitional boundaries or because it involves small private transactions. Our analysis of green finance is therefore indicative rather than comprehensive and includes green bond issuance, green IPOs, and green private equity investment.

## Global green finance

- Using our definition, we find that green finance has experienced dramatic growth over the past decade from a low base, rising from $5.2bn in 2012 to $540.6bn in 2021. Nevertheless, it remains a very small part of overall financing activity.
- Green finance remains heavily dominated by green bond issuance; green bonds accounted for fully 93.1% of total green finance (using our definition) globally over 2012-21. Global green bond issuance increased from $2.3bn in 2012 to $511.5bn in 2021. Cumulatively, global green bond issuance totalled $1.4trn over 2012-21.
- Global green lending has grown rapidly since 2017 (the first year for which comprehensive data are available); nevertheless, green loan activity remains limited and is concentrated in the syndicated loan market.
- Global green IPO activity has been volatile in both volume and value terms over the past decade. Meanwhile, green private equity market activity was stronger in the second half of the decade under consideration than in the first half, and was dominated by pure venture capital activity.

## UK green finance

- UK green bond issuance grew from $1.1bn in 2012 to $37.4bn in 2021; cumulative UK issuance over 2012-21 was $65bn. The inaugural green gilt issues in 2021 accounted for one-third of the UK's total green bond issuance over the past decade. The financial sector issued $28.9bn worth of green bonds over the past decade.
- Over the past decade, 23 UK companies received green private equity investment. As an investor nation, the UK witnessed significant green private equity investments only in 2012, 2013 and 2015. UK investors have mainly channelled their private equity investments to UK businesses in most years.

## Global green finance markets

- International comparisons of green financial market activity generally reflect the level of overall financial market activity. Thus, the US and China—the world's two largest economies and both with extremely large financial markets—dominate green finance markets by virtue of the sheer scale of their financing offerings. This may or may not tell us anything about these countries' green finance offerings specifically, however.
- For this reason, we have also undertaken analysis in relative terms, which compares green finance to overall finance in each country and market under consideration. This approach tends to favour small countries with small financial markets, but is valuable because it gives a sense of different countries' green finance penetration, or depth of offering. However, this may or may not indicate that these countries have particularly welcoming environments for green finance as it is impossble to draw firm conclusions from the data alone.
- The related professional services of legal, accounting and management consulting complete the wider green finance ecosystem. The UK's well-established strengths in these sectors may help enhance the UK's international position in green finance.

# Green finance: the global context

Green finance had been rising up the priority agenda for national governments and private-sector companies well before the outbreak of Covid-19. But the pandemic has clearly highlighted the importance of preparedness and mitigation strategies even for long-term issues such as climate change.[1]

Green finance has gained substantial momentum since the signing of the Paris Agreement in 2015. More than 100 countries have pledged to meet net-zero carbon emissions targets, and six—Denmark, France, Hungary, New Zealand, Sweden and the UK—have made these targets legally binding.

The financial and related professional services industry can play an important role in supporting public- and private-sector efforts to ensure that future economic growth is environmentally sustainable. For example, through products like green bonds and green loans, the financial services sector matches 'sources of funding to new capital and operating expenditures that generate measurable progress towards the achievement of a well-recognised environmental goal'.[2] As the largest and best-known part of the green finance market by far, green bonds will inevitably play a key role in an environmentally sustainable post-pandemic economic recovery. These instruments have become highly successful in recent years, with many sovereign issues being oversubscribed.[3]

Individual financial services sub-sectors may be able to exploit specific growth opportunities in green finance. For example, some asset managers report having seen increased demand for ESG-aligned portfolios in recent years, although hard data remain limited. According to the European SRI Study 2018 published by Eurosif in November 2018, the UK's assets under management in six sustainable and responsible investment (SRI) strategies out of seven experienced positive growth rates between 2015 and 2017. The total growth of the seven strategies (Best-in-class, Thematic fund, Norms- based Screening, ESG Integration, Engagement and Voting, and Exclusions and Impact Investing) was 27% during the two years. Asset managers may in future be able to continue capitalising on growing investor interest in such portfolios. For asset managers managing funds on behalf of High Net Worth Individuals or family offices—which are often, though not always, associated more closely with patient capital—long term, sustainability-focused financial instruments may present an opportunity.[4]

Nevertheless, important challenges also remain. Perhaps foremost among these are the lack of commonly-agreed definitions and classification systems, which is a significant barrier to progressing sustainability further within financial markets and sustainability disclosure. The challenge has been well-documented for green finance; for example, research by TheCityUK and Imperial College Business School has addressed the ways that lack of standard definitions and benchmarks inhibit scale in green infrastructure investment.[5] A major challenge for policymakers globally is therefore how to corral and align around shared policies to drive green finance, including in areas such as disclosure of climate risk and around definitions of what is deemed to be sustainable or not.

Significant work in this area has, of course, been undertaken — some systemic, and some relating to specific sub-sectors within green finance. For example, the EU Taxonomy has provided a strategy to reorient private capital towards more sustainable investments by providing a classification system. The EU Taxonomy Regulation came into force in 2020, and other countries such as the UK and Singapore are considering similar approaches as part of their decarbonisation strategies, whilst noting the need for interoperability with different taxonomies. The UK government announced in November 2020 that it would develop its own green taxonomy with a view to averting so-called 'greenwashing' and accelerating the transition to a net-zero economy by providing useful data to enable investors and consumers to make informed decisions. The UK's taxonomy will be based on the EU taxonomy, and the metrics will be reviewed by a UK Green Technical Advisory Group to ensure they are suitable for the UK.

The Partnership for Carbon Accounting Financials (PCAF) is an international initiative that seeks to measure and disclose the greenhouse gas emissions financed by financial institutions in a uniform and transparent way. The current (first) version of the standard includes six asset classes: listed equity and corporate bonds, business loans and unlisted equity, project finance, commercial real estate, mortgages, and motor vehicle loans. This demonstrates that — like all standards and frameworks in this area — PCAF should be considered a useful starting point, but an evolving work in progress. According to PCAF, more than 210 financial institutions with more than $63trn in total assets have joined the initiative.[6]

Another notable initiative was the Task Force on Climate Related Financial Disclosures (TCFD), which in 2017 released climate related financial disclosure recommendations designed to help companies provide better information to support informed capital allocation. The TCFD recommendations focus on four themes on how businesses operate so that they can better disclose their climate-related risks and opportunities: governance, strategy, risk management, and metrics and targets. The TCFD has been instrumental in helping to standardise climate risk information, which assists asset managers when making sustainability assessments.

1 TheCityUK, 'A roadmap for economic recovery: The role of financial and related professional services', April 2021, available at: https://www.thecityuk.com/assets/2021/Reports/10d2643408/A-roadmap-for-economic-recovery-The-role-of-financial-and-related-professional-services.pdf

2 TheCityUK and Imperial College Business School, `Growing green finance', (September 2017), available at: https://www.thecityuk.com/assets/2017/Reports-PDF/21ef6f5fef/Growing-Green-Finance.pdf

3 For more detail, see TheCityUK and Imperial College Business School, 'Understanding green bonds', (May 2018), available at: https://www.thecityuk.com/assets/2018/Reports-PDF/bf2095d362/Understanding-Green-Bonds.pdf

4 TheCityUK, 'A roadmap for economic recovery: The role of financial and related professional services', April 2021, available at: https://www.thecityuk.com/assets/2021/Reports/10d2643408/A-roadmap-for-economic-recovery-The-role-of-financial-and-related-professional-services.pdf

5 TheCityUK and Imperial College Business School, 'Financing low-carbon infrastructure', November 2019, available at: https://www.thecityuk.com/assets/2019/Report-PDFs/1e93c07cca/Financing-low-carbon-infrastructure.pdf

6 Partnership for carbon accounting financials, "Financial institutions taking actions", available at: https://carbonaccountingfinancials.com/financial-institutions-taking-action#overview-of-financial-institutions

# Green finance: the UK context

Given the scale of the challenge and the time-sensitive nature of reducing global carbon emissions to slow climate change, the need to mobilise and accelerate green finance has never been greater. Policy makers and regulators across the world are increasingly intervening in financial markets to address climate change adaption and mitigation risks as part of the transition to a net zero economy.

The UK and other European countries are developing green finance, green financial products and ESG ratings at an accelerating pace. The development of green finance has not been solely driven by national or international policies or regulations, but very much by investor and corporate issuer dialogue on the materiality of sustainability issues, against a wider global backdrop of asset owner appetite and demand, societal concerns, and political demand for action.

In this context, the UK government issued its first sovereign green bond in September 2021, with a follow-on issuance in October 2021. Total green gilt issuance for the financial year reached £16bn.[7,8] The proceeds from green gilt and retail green savings bonds will be allocated to projects in clean transportation, renewable energy, energy efficiency, pollution prevention and control, living and natural resources and climate change adaptation.[9] The UK government also intends to report on social co-benefits of expenditures financed by the green gilt such as job creation, access to affordable infrastructure and socioeconomic advancement to ensure transparency for retail and institutional investors.

But the need for policy and regulation to drive sustainable finance is now undisputed in all sectors of the economy, not least in financial and related professional services. As with any policy or regulation that seeks to respond to the global, cross border challenge of climate change, policies are most effective when they are globalised and interoperable so that, for example, the asset manager's task of assessing a firm's transition and sustainability credentials is simplified by having standardised sets of data which can be used for reporting in different countries.

The UK, as the host country of COP26 in November 2021, has significantly advanced its policies to respond to climate change. It released its Green Finance Strategy in 2019; this distinguished between introducing green products and services into the financial system (or, 'greening finance') and funding environmentally-friendly activities (or, 'financing green').[10]

As part of a suite of UK policy announcements ahead of COP26 in Glasgow in November 2021, the UK government announced that by April 2022, the TCFD recommendations would become mandatory for the UK's largest businesses.[11] Other UK policy announcements include HM Treasury's launch of the Green Taxonomy Advisory Group in June 2021; its Roadmap on Greening Finance in October 2021; the Chancellor of the Exchequer's plans for the UK to be the world's first net zero aligned financial centre and the announcement of a Transition Plan Taskforce; and the Financial Conduct Authority's (FCA) work on disclosure requirements. The FCA's work seeks to develop rules on sustainable investment labels, consumer-facing disclosures for investment products, and asset managers and FCA-regulated asset owners' responsibilities for client and product-level disclosures. The October 2021 roadmap focuses on the first part of greening the financial system – informing investors and consumers – sustainability disclosure requirements (SDR), green taxonomy, and responsible investor stewardship. SDR aims to provide sustainability information to investors, customers, and other stakeholders on how firms impact the environment to eliminate the issue of asymmetry of information between investors and corporates.

As part of the UK government's efforts to mobilise private savings, HM Treasury launched a green savings bond through National Savings and Investment (NS&I) in summer 2021. This initiative permits UK savers to use their savings in funding environmentally-friendly projects in green transportation, renewable energy, pollution prevention, energy efficiency, natural resources protection, and climate change adaptation. Green savings bonds will broaden the range of products that the UK government can utilise to attract funding for its public spending.

The Department for Business, Energy and Industrial Strategy (BEIS) released its Net Zero Strategy in October 2021. The Net Zero Strategy outlines the UK economy's path to cutting domestic emissions, highlights green opportunities, and sets out plans to enhance private investment into net zero, with the intention to revise the BEIS Green Finance Strategy in 2022. With regard to public spending, in March 2021 the UK government committed to a total of £30bn for domestic investment for the UK's "green industrial revolution". The UK government estimates that additional capital investment must exceed current levels to an average of £50-60bn per year from the late 2020s and into the 2030s,[12] and envisages that most of this investment will come from the private sector. It is widely accepted in the UK and globally that, without private finance, net zero cannot be reached.[13]

COP26 was successful in advancing global cooperation on climate change policies and showcased the UK as a leader in several areas, such as being the first major economy to enshrine a legal commitment to net zero by 2050; becoming the world's leading offshore wind energy producer; and making the TCFD recommendations mandatory for large businesses

7 UK Government, 'UK's first green gilt raises £10 billion for green projects', (September 2021), available at: https://www.gov.uk/government/news/uks-first-green-gilt-raises-10-billion-for-green-projects

8 UK Government, 'Second UK green gilt raises further £6 billion for green projects', (October 2021), available at: https://www.gov.uk/government/news/second-uk-green-gilt-raises-further-6-billion-for-green-projects

9 HM Treasury, UK government green financing framework, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002578/20210630_UK_Government_Green_Financing_Framework.pdf

10 HM Government, "Green finance strategy: transforming finance for a greener future," July 2019, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf

11 The UK Government, "UK to enshrine mandatory climate disclosures for largest companies in law, 29 Oct 2021", available at: https://www.gov.uk/government/news/uk-to-enshrine-mandatory-climate-disclosures-for-largest-companies-in-law

12 The UK Government, BEIS Net Zero Strategy, Oct 2021, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf

13 UN climate change conference UK 2021, "Global finance ministers gather to discuss how public and private finance can lead the transition to a net zero, climate resilient world", 3 Nov 2021, available at: https://ukcop26.org/global-finance-ministers-gather-to-discuss-how-public-and-private-finance-can-lead-the-transition-to-a-net-zero-climate-resilient-world/

from April 2022.[14] The Finance Day at COP26 focussed on strategic announcements such as the Bank of England and Prudential Regulation Authority's role in risk management capabilities for climate-related financial risks, the creation of the International Sustainability Standards Board (ISSB) and the launch of the Glasgow Financial Alliance for Net Zero (GFANZ)'s progress report, outlining the work of the various net zero alliances for insurance, asset management, asset ownership and banking. In terms of "greening finance" HM Treasury's Roadmap outlines policies to address the sustainability information gap and the information flow from corporates to financial services. At the international level, progress was also made on the Paris Rulebook with regards to carbon accounting, carbon credits and carbon markets.

The next phase will focus on the consultation and implementation of the policies arising from the announcements leading up to and at COP26. Those announcements were ambitious, and were necessarily so, if there is to be any realistic prospect of meeting the Paris Agreement's target to limit global warming to 1.5°C above pre-industrial levels. The UK's financial and professional services ecosystem is central to enabling financial services firms and other corporate sectors to navigate through the risks and opportunities of the climate transition and ultimately to their ability to reach net zero targets.

14 UN climate change conference UK 2021, "UK climate leadership", available at: https://ukcop26.org/uk-presidency/uk-climate-leadership/

# Global green finance

As noted above, the lack of standardised definitions and classification systems for green finance and green assets is a major complication when trying to quantify green finance. The different standards and definitions in use means that green finance data is not necessarily consistent across sources. Moreover, much financing activity that could be considered green is not necessarily captured in green finance data, either because of definitional boundaries or because it involves small private transactions (for example, angel investment). As a result, TheCityUK's analysis, which includes green bonds, IPOs, and private equity (with venture capital as a subset of private equity), should be considered indicative rather than comprehensive (standardised time-series data was not available for green lending). Moreover, green finance is only part of the wider category of sustainable finance. Sustainable finance focuses on environmental, social and governance (ESG) considerations and includes additional instruments not covered in this research, such as sustainability-linked bonds (SLBs)—see the case study for more detail. Details of our definition of green are in the Methodology chapter.

### CASE STUDY: Sustainability-linked bonds

Sustainability-linked bonds embed ESG-related key performance indicators (KPIs) that issuers commit towards, and accrue additional payments to bondholders if the issuers fall short of these targets. Unlike green or sustainable bonds, SLB funds are used for general corporate purposes but they allow the issuer to anchor its medium- to long-term sustainability goals in its financing.

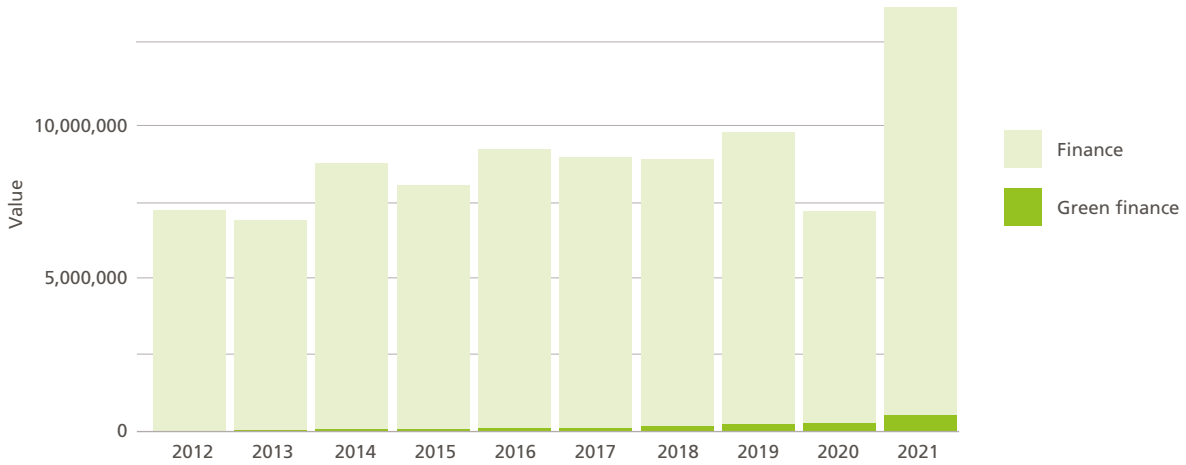
In 2019, Italian energy company Enel came to the market with the first ever sustainability-linked bond (SLB). However, the market for SLBs flourished in 2021 following the publication of the SLB Principles administered by ICMA in June 2020. In 2021, there was over $91bn of SLB issuance. Across the SLB spectrum, many issuers have embedded science-based decarbonisation targets across their business. This includes both hig- emitting sectors and leading low-carbon-economy industries; issuers include the energy, utilities, retail, manufacturing, pharmaceuticals, and real estate sectors.

In the UK, Tesco became the first UK corporate to issue an SLB in January 2021. Tesco's €750m benchmark 8.5-year SLB (in which BNP Paribas acted as joint sustainability structuring advisor and joint bookrunner), is tied to the company's scope 1 and 2 greenhouse gas emissions reduction targets. Specifically through the SLB, Tesco has committed to progressive sustainability performance targets (SPTs) to reduce the its greenhouse gas emissions by 60% by 2025, with respect to a 2015/16 baseline. Tesco's SLB received strong investor demand, and was more than six times oversubscribed.

## Green finance overall

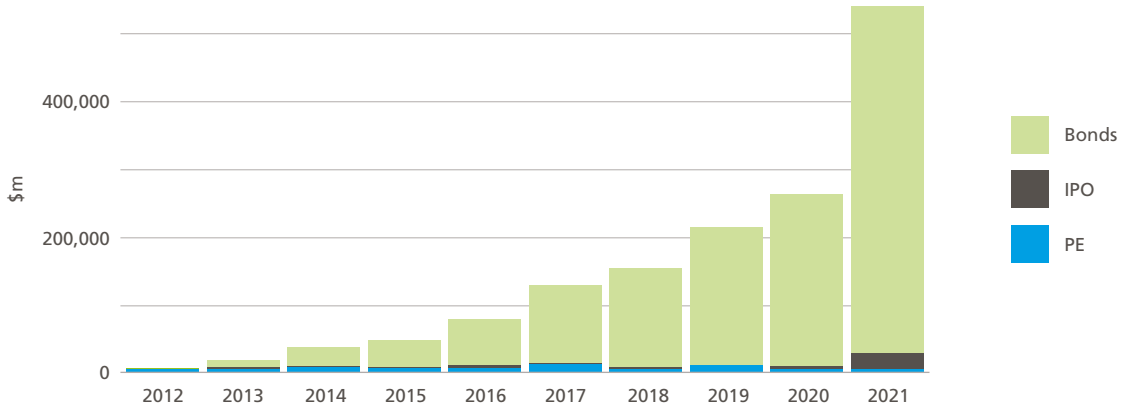
Over the past decade, the value of green finance (bond issues, IPOs, and private equity investment) has grown from $5.2bn in 2012 to $540.6bn in 2021. However, green finance remains a very small part of finance overall, representing 1.7% of total finance (on a like-for-like basis) over 2012-21 cumulatively. The share of green finance in total finance has steadily increased from around 0.1% in 2012 to slightly more than 4% in 2021.

**Figure 1:** Global green and non-green finance
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




Green bonds dominated green finance overall, accounting for fully 93.1% of total green finance over 2012-21. (The share of green IPOs and green private equity in total green finance over the same period has been nearly equal, at 3.4% each.)

**Figure 2:** Global green finance
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

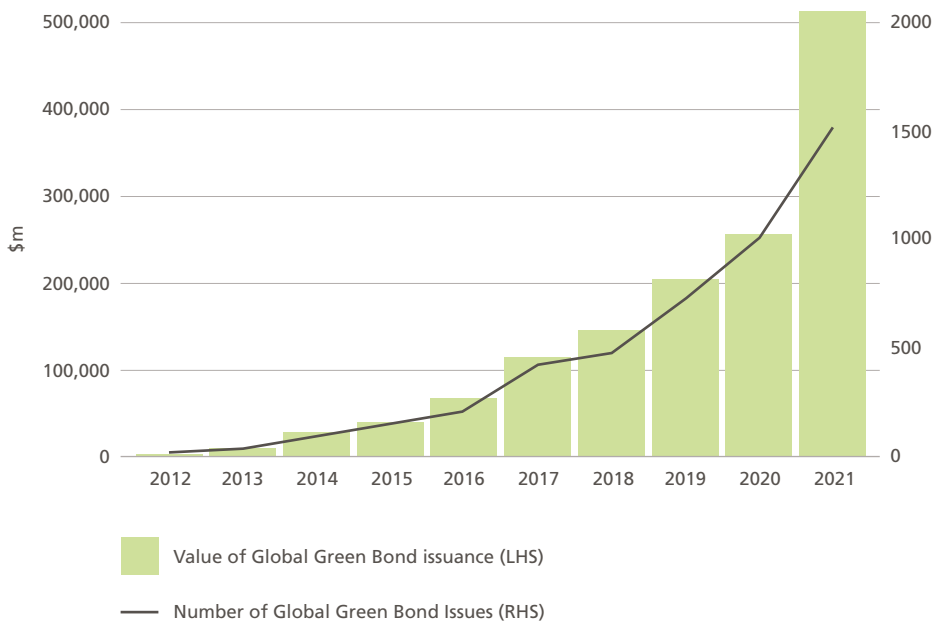



## Debt

Global **green bond issuance** has grown steadily over the past decade, increasing from $2.3bn in 2012 to $511.5bn in 2021. Cumulatively, global green bond issuance totalled $1.4trn over 2012-21. The number of green bond issuances has also grown steadily over the period. It is important to put these figures in context. Green bonds remain a minuscule part of the overall bond market, accounting for around 1.7% of total bond issuance over 2012-21.

**Figure 3:** Global green bond issuance

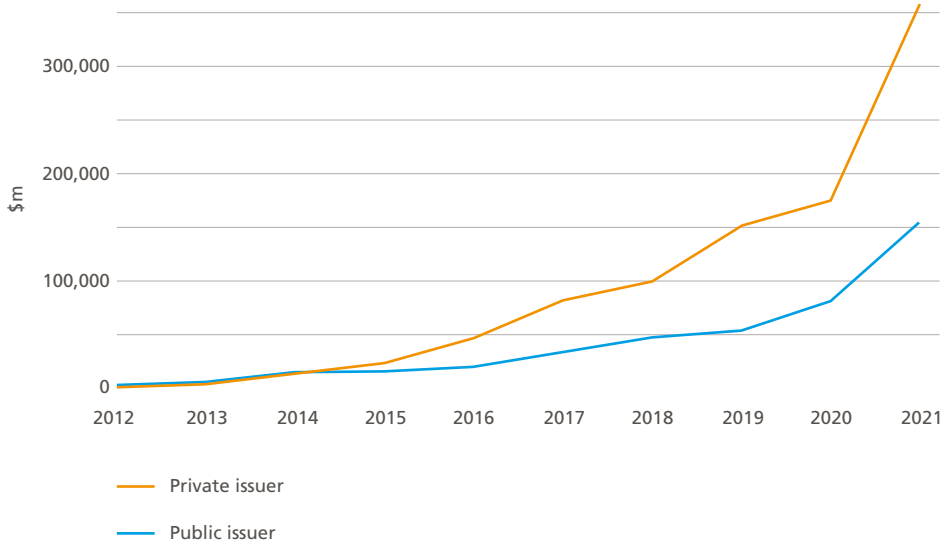
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




Green bond issuance growth has been steady in both the public and private sectors. Although public issuers were responsible for almost all issuance in 2012, corporate issuers subsequently caught up and in fact have dominated green debt capital markets since 2015. European countries have issued nine of the ten largest public green bonds in the past ten years, with the largest being the sovereign issues of the UK ($13.7bn) and Italy ($10.1bn), both in 2021. US companies have issued four out of the ten largest corporate green bonds between 2012-21, with the largest corporate issuance in the period being that of Apple in 2016 ($12bn, in seven tranches).

**Figure 4:** Global public vs private green bond issuance

**Source:** TheCityUK analysis based on data from Refinitiv Workspace

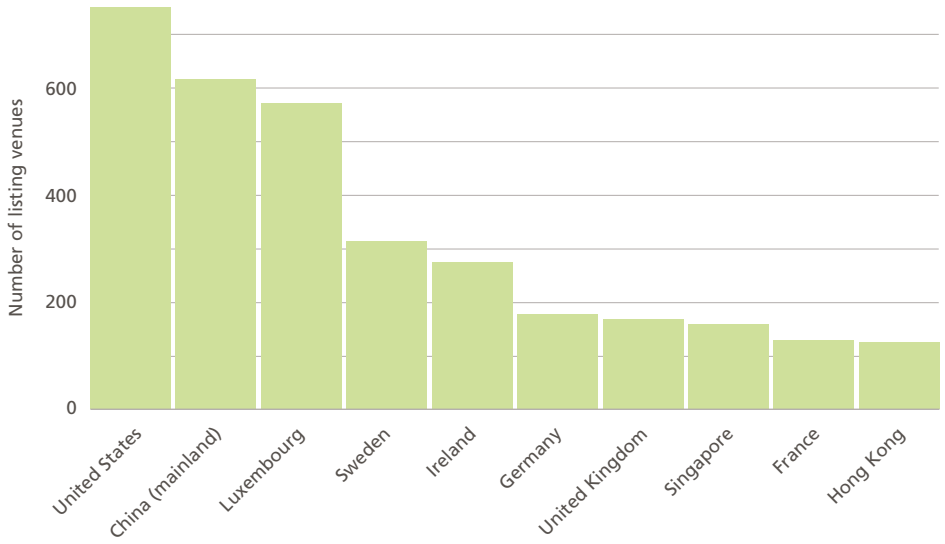



Our analysis shows that public and private green bond issuance is strongly positively correlated. The data do not indicate causality. However, research has shown that public issuance tends to encourage private issuance by "[providing] liquidity and initial market product pipelines as well as engaging and educating investors about green bonds".[15, 16]

15 Asian development bank institute, "Oil price shocks and green bonds: a longitudinal multilevel model", Jul 2021, available at: https://www.adb.org/sites/default/files/publication/726181/adbi-wp1278.pdf

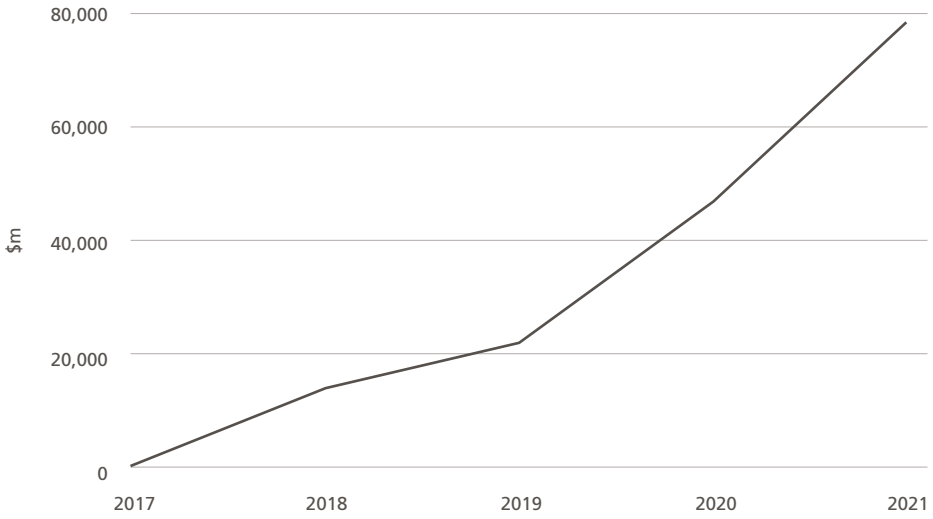
16 Impact investing institute, LSE & Grantham research institute, "The green + bond: how EU sovereign and corporate issuers could deliver green bonds with social co-benefits", available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/10/Impact-Investing-Institute-EU-Green-Bond-Proposal-October-2021-1.pdf

**Figure 5:** Green bond listing venues, selected exchanges
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




In terms of listing venues, exchanges in the US, China and Luxembourg had the most green bond listings. The London Stock Exchange had 167 green bond listings over 2012-21.

**Figure 6:** Global green lending
**Source:** Dealogic, courtesy of AFME




**Green lending** has grown rapidly since 2017 (the first year for which comprehensive data are available), albeit from an extremely low (almost non-existent) base. Global green lending in 2017 was around $432m, rising to $78.6bn in 2021.

**Figure 7:** Sustainable loans: mandated arranger league table, 2021
**Source:** Refinitiv, 'Sustainable Finance Review, Full Year 2021'

| Mandated Arranger | Rank FY 2021 | Rank FY 2020 | Proceeds ($mil) | Mkt. Share (%) | Mkt. Share Chg. | # Issues |
|---|---|---|---|---|---|---|
| BofA Securities Inc | 1 | 14 | $41,249.6 | 5.8 | 3.6 | 191 |
| JP Morgan | 2 | 11 | $35,060.0 | 4.9 | 2.5 | 170 |
| BNP Paribas SA | 3 | 2 | $32,805.6 | 4.6 | -1.2 | 239 |
| Mizuho Financial Group | 4 | 1 | $32,016.4 | 4.5 | -1.5 | 164 |
| Citi | 5 | 10 | $28,810.8 | 4.0 | 1.5 | 150 |
| Mitsubishi UFJ Financial Group | 6 | 4 | $27,809.5 | 3.9 | -0.5 | 170 |
| Credit Agricole CIB | 7 | 6 | $25,404.8 | 3.6 | 0.2 | 183 |
| Sumitomo Mitsui Finl Grp Inc | 8 | 3 | $24,306.1 | 3.4 | -1.3 | 184 |
| HSBC Holdings PLC | 9 | 8 | $22,510.0 | 3.1 | 0.2 | 147 |
| Wells Fargo & Co | 10 | 29 | $20,302.3 | 2.8 | 1.8 | 92 |
| Societe Generale | 11 | 5 | $18,538.9 | 2.6 | -1.3 | 160 |
| ING | 12 | 9 | $18,235.6 | 2.5 | -0.2 | 150 |
| Deutsche Bank | 13 | 15 | $18,198.1 | 2.5 | 0.4 | 107 |
| Barclays | 14 | 12 | $16,746.8 | 2.3 | 0.0 | 92 |
| Santander Corp & Invest Bkg | 15 | 7 | $15,546.3 | 2.2 | -1.0 | 119 |
| **Industry Total** | - | - | **$716,561.2** | **100.0** | - | **835** |

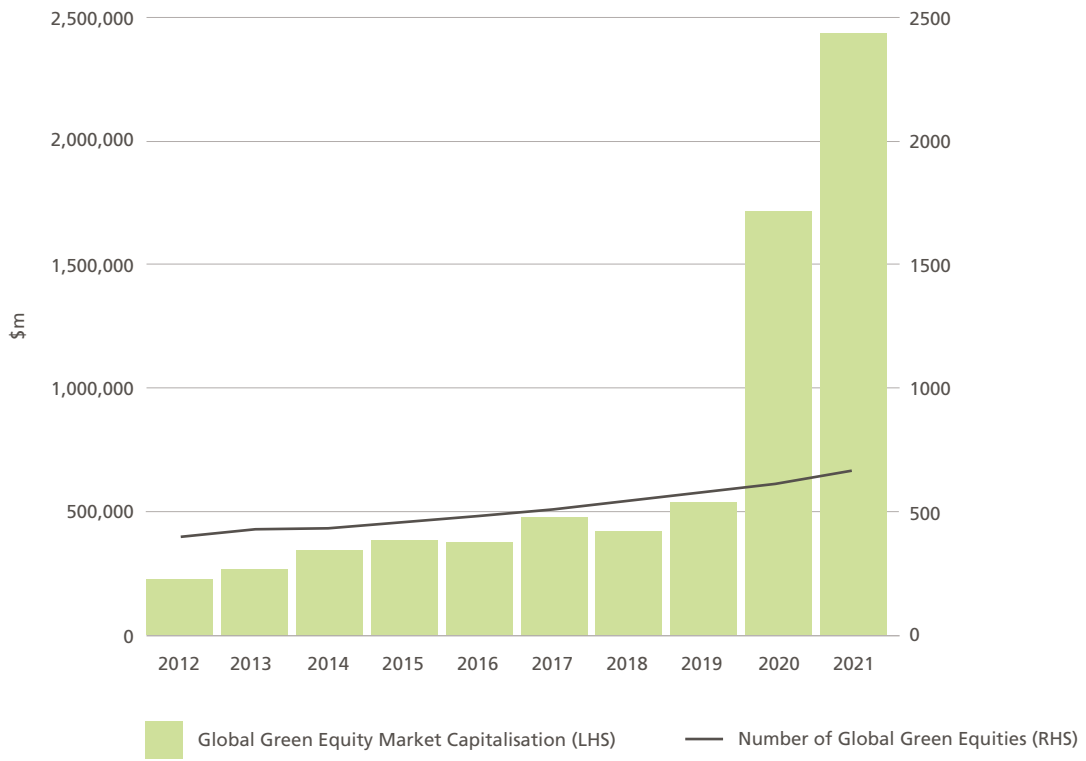
Refinitiv data show that US, French and Japanese banks dominated sustainable lending in 2021, with banks from these three countries accounting for 40% of green loan arranging.

## Equity

Green companies' **market capitalisation** (a snapshot of the market value of publicly traded companies at a particular point in time) has maintained a positive overall trend, with an average annual growth rate of 40.1% using year-end market capitalisations for 2012-21. This figure was heavily skewed by the 31 December 2020 and 31 December 2021 market capitalisation, however; excluding green market capitalisation of both years and considering only 2012-2019, green market capitalisation growth was 13.9%. The number of publicly traded companies involved in green activities has grown steadily over the past decade, from 401 companies in 2012 to 669 in 2021.

While market capitalisation gives an indication of the value of companies—although not financing activity per se—by multiplying stock price by the number of shares, it worth noting that multiple factors other than the performance of a company and its financial health can influence market capitalisation, such as investor perception and confidence.

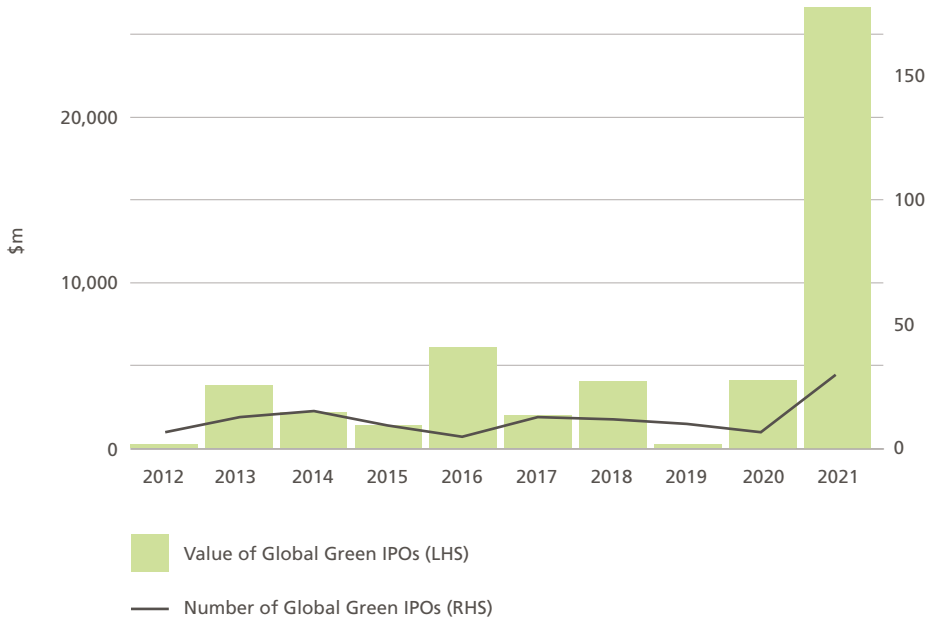
**Figure 8:** Green equities and market capitalisation
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



Because market capitalisation data are indicative—presenting only snapshots of points in time, we have used **IPO volumes and values** to assess green equity markets. Global green IPO activity has been volatile in both volume and value terms over the past decade, with a surge in activity in 2021. Cumulatively, there were 129 green IPOs globally over 2012-21.

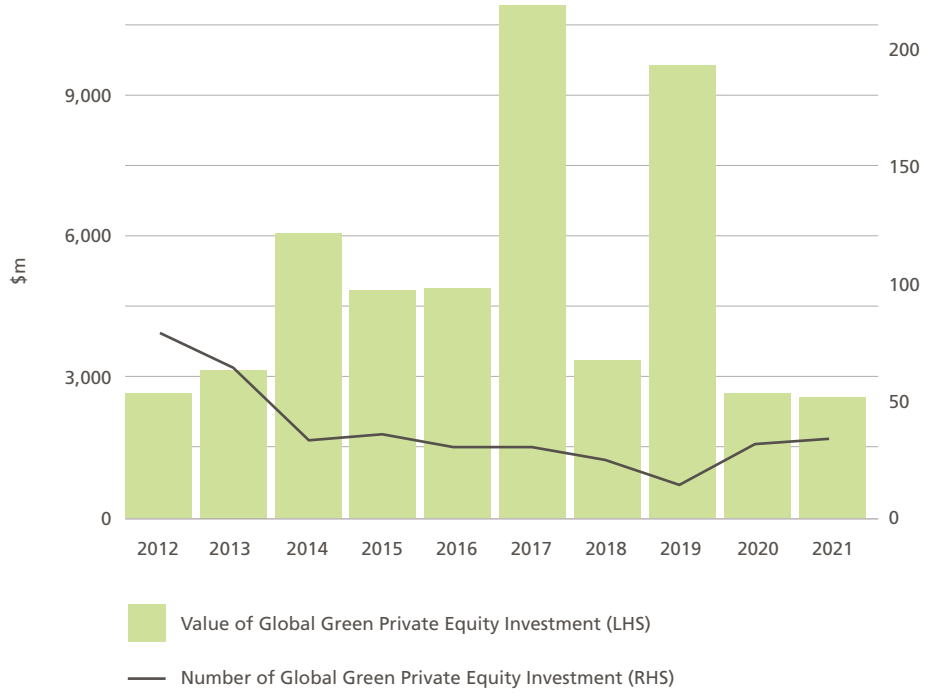
The US hosted five of the largest ten green IPOs over the past decade, of which three were listed on the Nasdaq and two on the New York Stock Exchange. Sector-wise, green IPOs were most prominent in the electric (alternative) vehicles sector, followed by hydroelectric and tidal utilities and then alternative electric utilities.

**Figure 9:** Green IPOs
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




**Green private equity** investment consists of venture capital deals, buyout deals, venture capital reporter deals, and pure venture capital deals. Over the past decade, 2017 and 2019 were stand-out years for green private equity investment, driven by four large private equity investments in Chinese companies in 2017 and investment in one US-based company, Rivian Automotive, in 2019.

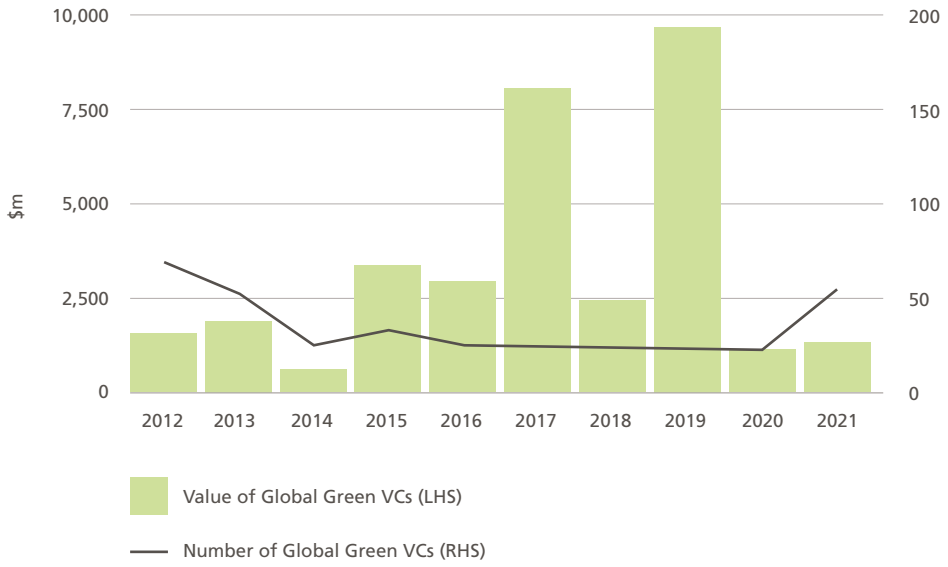
**Figure 10:** Green private equity
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




The consumer cyclical sector received the most green private equity investment over the past decade, with investment totalling $26.8bn and accounting for 52.8% of total green private equity investment.

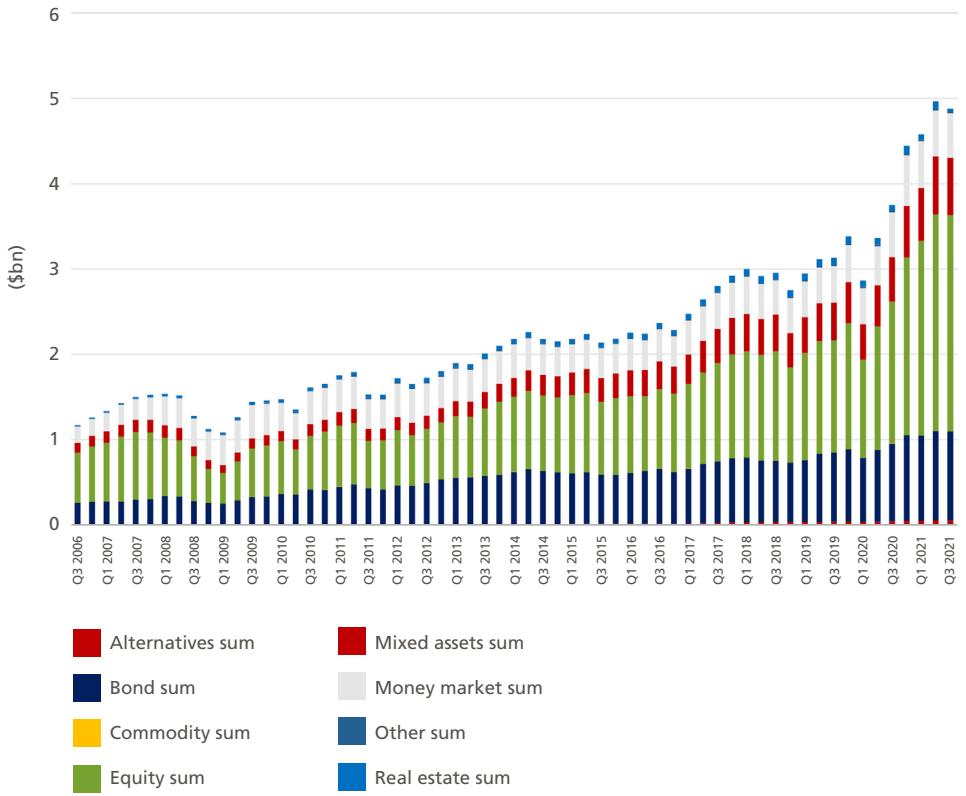
Green **pure venture capital** investment comprised the lion's share (64.6%) of private equity and therefore was the biggest driver of trends in the wider green private equity market. Pure venture capital investment was volatile over 2012-21, with large increases in 2017 and 2019 followed by declines in 2018 and 2020.

**Figure 11:** Green venture capital
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




**ESG funds** have grown steadily over the past decade and have exhibited particularly strong growth since 2020. According to data from AFME, "ESG equity funds continue to be by far the largest fund asset class, over three times larger than fixed income".[17]

**Figure 12:** Global ESG Funds by asset class
**Source:** AFME



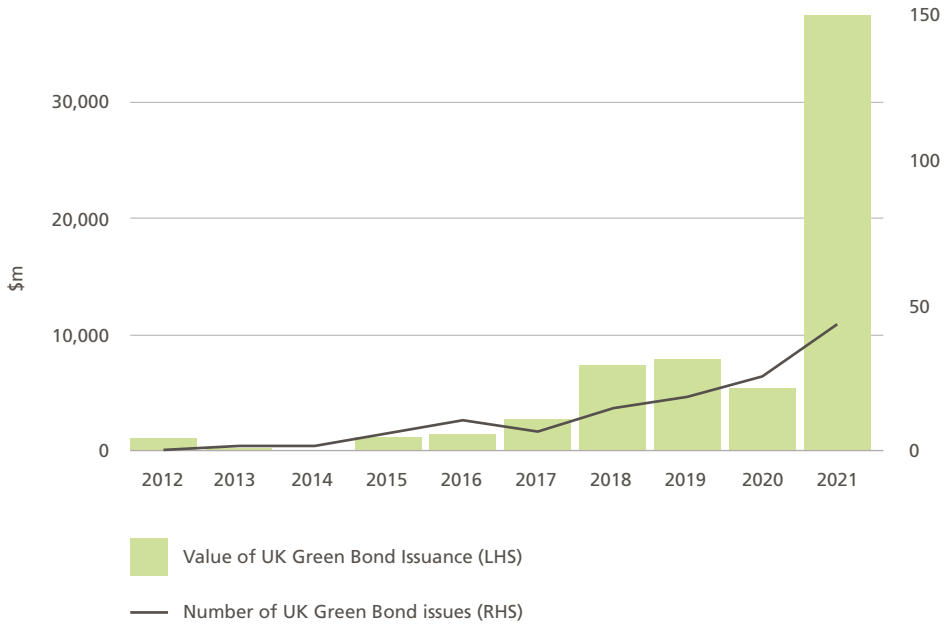

17 AFME, 'Q3 2021 ESG finance report: European sustainable finance', available at: https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME%20Sustainable%20Finance%20Report%20-%202021%20Q3.pdf

# UK green finance

## Debt

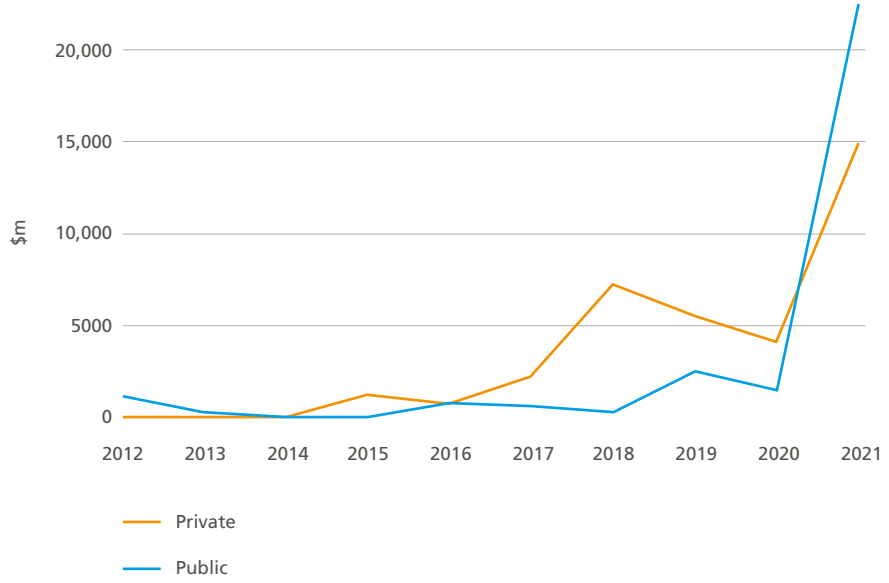
**UK green bond** issuance grew from $1.1bn in 2012 to $37.4bn in 2021; cumulative issuance over the ten years was $65bn. The number of UK green bond issues has also increased during the past decade.

**Figure 13:** UK green bond issuance
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




The largest UK green bonds issued over the past decade were the green gilt issuances in autumn 2021. These accounted for one-third of the UK's total green bond issuance over 2012-21. The UK private sector issued 89 green bonds, of which 74 were of 'investment grade corporate' bond type.

**Figure 14:** UK private and public green bond issuance
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

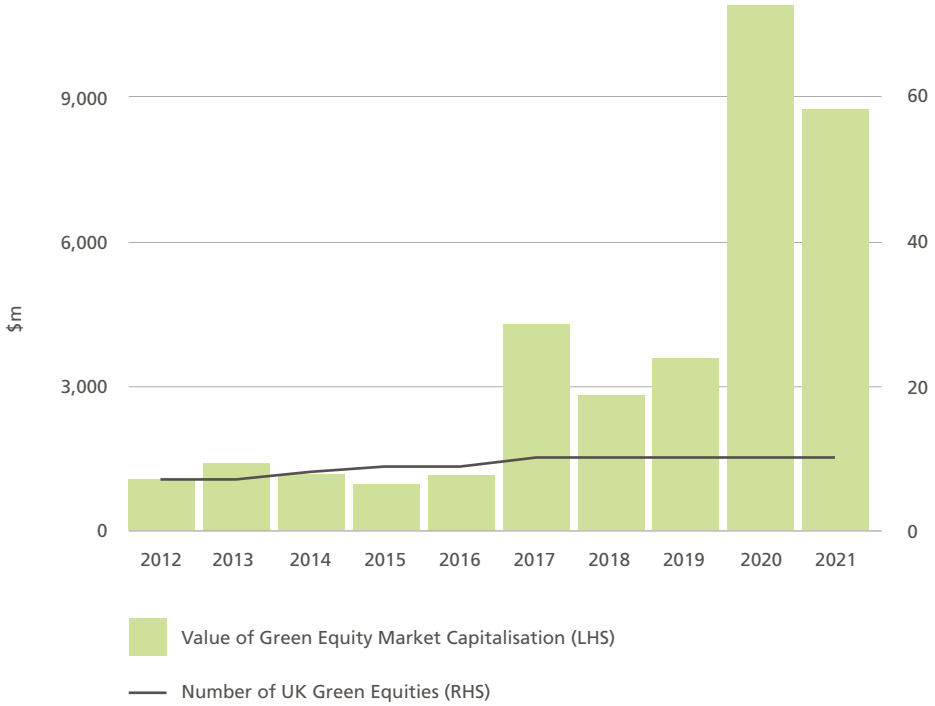



The other 42 UK public sector green bonds were issued by the European Bank for Reconstruction and Development (EBRD), which is headquartered in London; the categorisation of the data did not permit disaggregation of sovereign and supranational issuance. In the first three years of the decade under consideration, "agency, supranational and sovereign" entities were in fact the only issuer of green bonds in the UK; the first issuance of a private green bond was in 2015. However, corporate issuers then dominated from 2015 onwards until 2021 (when the inaugural green gilt issues dominated). The financial sector issued $28.9bn worth of green bonds over the past decade, of which $27.8bn was issued by the banking and investment sub-sector, $323.3m by the insurance sub-sector, and the remaining $853m by the collective investment sub-sector. Vodafone was responsible for the biggest single corporate green bond issue in the UK, with a $2.8bn issue in 2019.

## Equity

UK green **market capitalisation** has generally been low over the past decade. The first significant increase was in 2017, when it stood at $4.3bn at year-end compared with $1.1bn at end-2016. The years 2020 and 2021 both saw much higher green equity market capitalisation relative to the previous eight years.

**Figure 15:** UK green market capitalisation
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




ITM Power, which is involved in the hydrogen fuel business, was the company with the biggest green market capitalisation in 2021, at $3.3bn on 31 December 2021. Indeed, hydrogen fuels as a sector had the biggest green market capitalisation as of 31 December 2021.

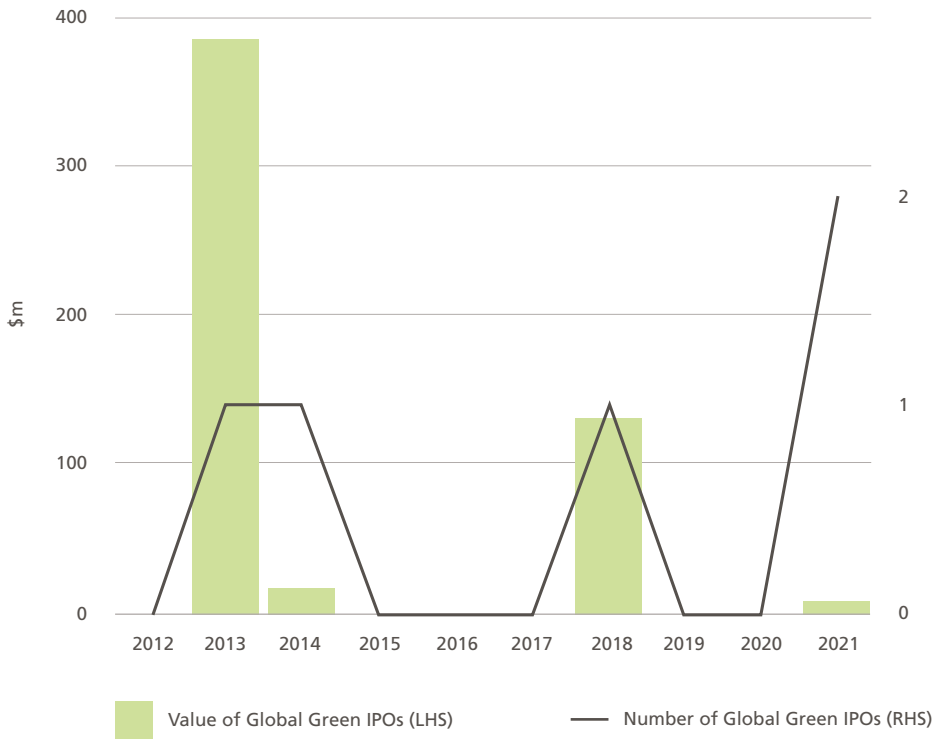
**Figure 16:** UK green market capitalisation by sector as of 31 Dec 2021
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Sector | Value $m |
|---|---|
| Hydrogen fuel | 3,268.4 |
| Stationary fuel cells | 3,061.2 |
| Independent power producers (NEC) | 1,699.1 |
| Waste to energy systems and equipment | 235.8 |
| Biomass & biogas fuels | 196.1 |
| Renewable energy equipment and services (NEC) | 140.8 |
| Pyrolytic and synthetic fuels | 139.5 |
| Wave power energy equipment | 15.4 |

The recent increase in UK green market capitalisation carries with it positive growth potential mainly with regard to private equity buyout activities. As market capitalisation is considered a proxy for depth and liquidity of financial markets, this growth in UK green market capitalisation offers promising potential exits for private equity buyout activities via IPOs, which could encourage future green private equity activities in the UK financial market.

The value of **green IPOs** remained extremely small, with a cumulative sum of $538m over the past decade and a maximum in a single year, in 2013, of $383m. The UK only witnessed green IPO activity in 2013, 2014, and 2018, and 2021 with a total of five IPOs.

**Figure 17:** UK green IPOs
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

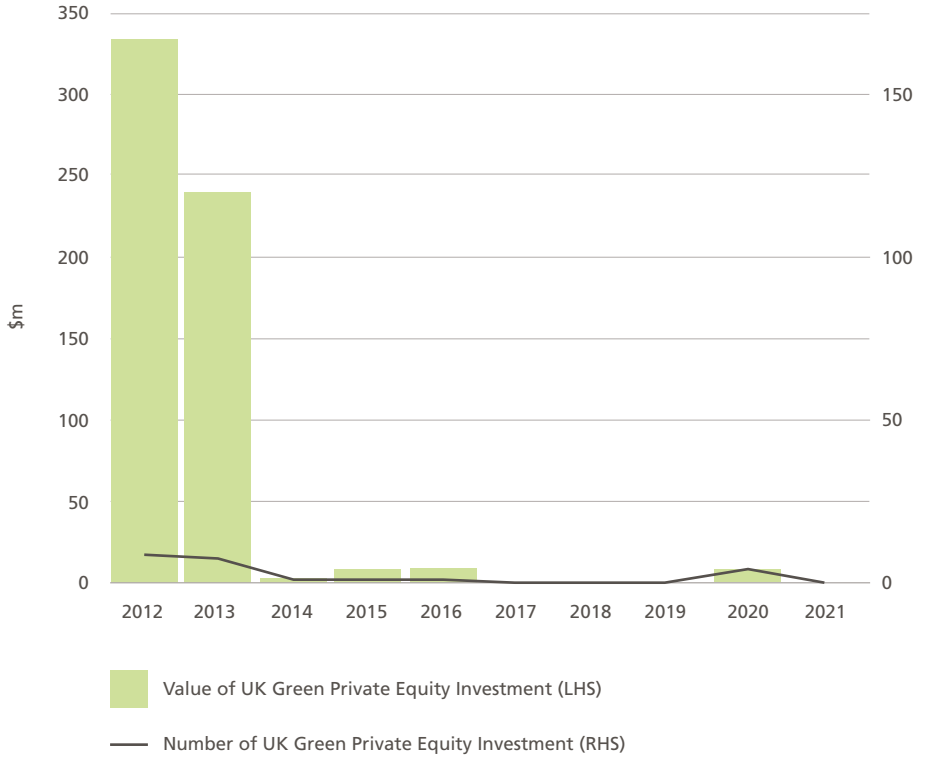



According to the London Stock Exchange, green economy mark issuers, which are companies and funds that generate 50% or more of their total revenues from green activities, raised 9% of total capital raised as of March 2021. Between April 2019 and March 2021, green mark issuers raised £8.86bn to fund R&D, innovation, and capacity building in growing green markets. Additionally, there are 101 equity issuers that hold the green economy mark, accounting for 5% of the total number equity issuers. 71 of these green mark issuers are corporates, and 30 are closed-end funds.[18]

18 London Stock Exchange, 'Where there's green, there's growth: Green economy report 2021', available at: https://www.londonstockexchange.com/raise-finance/equity/green-economy-mark/green-economy-mark-report-2021

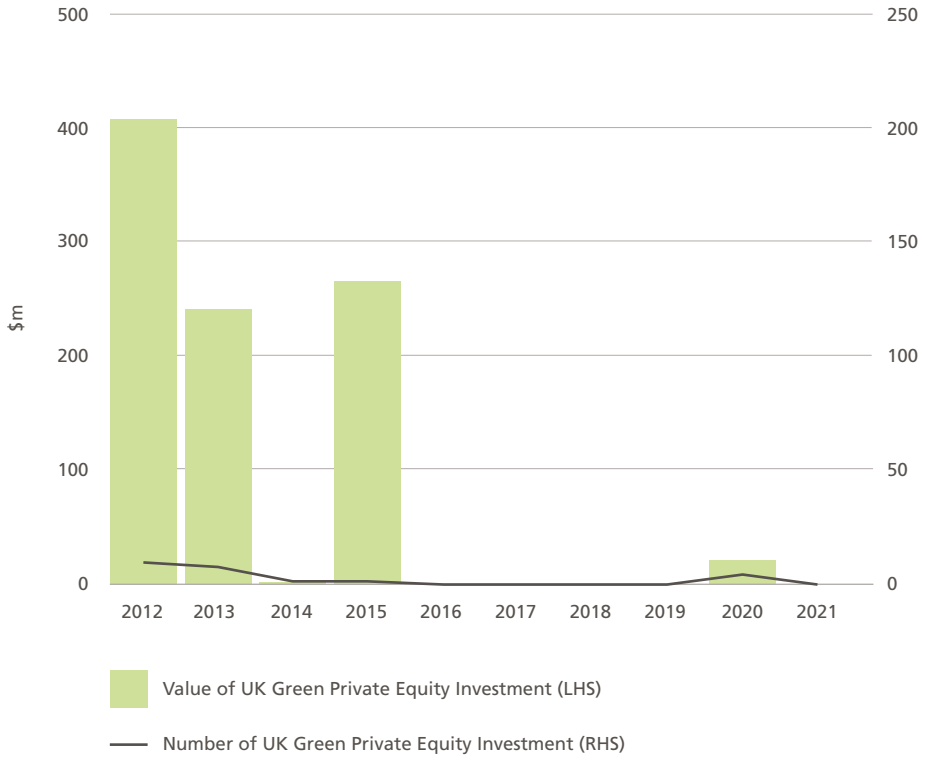
Over the past decade, 23 UK companies received **green private equity** investment; three of these investments had overseas investors, and the remainder had domestic investors. In comparison with other years, UK companies received large green private equity investments in 2012 and 2013.

**Figure 18:** UK green private equity investment (Investee)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




Over 2012-21, 28 UK investors invested in the green private equity market in 20 UK companies and eight foreign companies. Meanwhile, as an investor nation, the UK witnessed significant green private equity investments in 2012,2013 and 2015.

**Figure 19:** UK green private equity investment (Investor)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



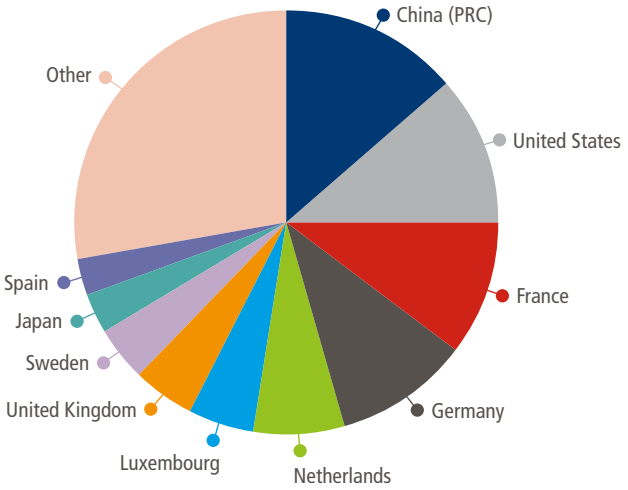

The data show that UK investors have mainly channelled their private equity investments to UK businesses in most years. In 2012, UK investors invested $408.9m in the green private equity market, of which 80% went to UK-based private businesses. In the following year, 99% of the $242.3m of UK investors' funds were invested in UK-based private businesses. In 2014, UK investors only invested $2.5m, which was entirely channelled to UK businesses. This trend was reversed in 2015, however, when UK investors invested $266.6m in green private equity, of which only 3% was in UK-based private businesses. In 2020, 36.2% of $21.9m of UK green private equity was invested in UK-based private businesses. The majority of investments were channelled into the energy sector in the UK.

# Green finance markets

## Debt

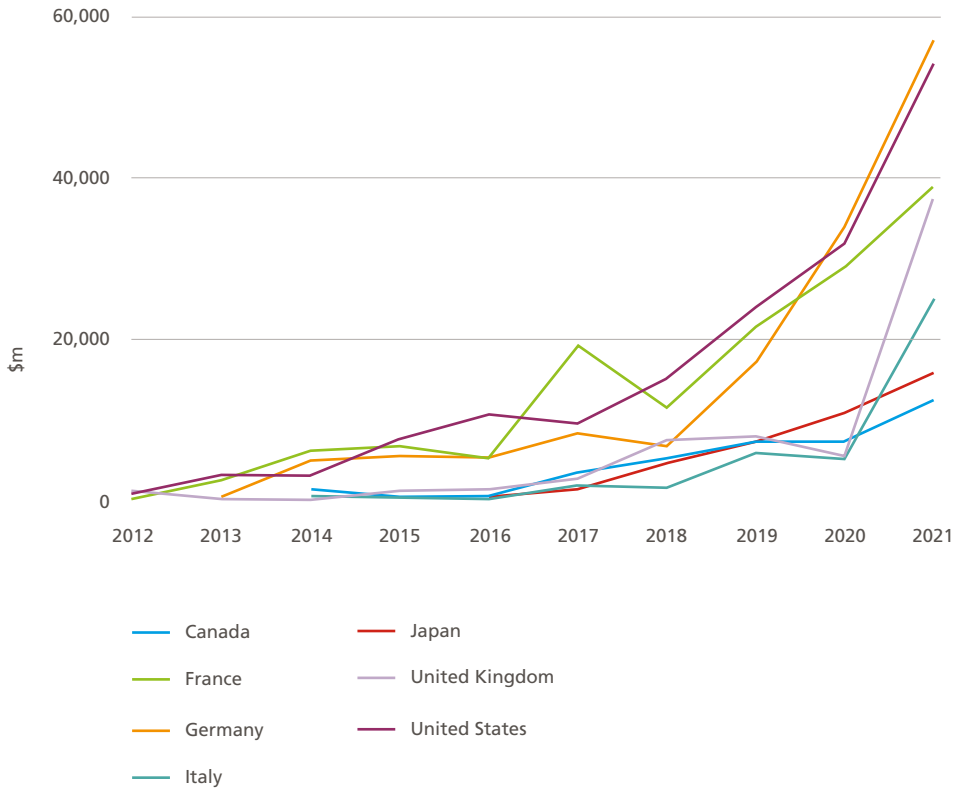
On a cumulative basis over 2012-21, China and the US had the world's largest green bond markets, representing 13.6% and 11.6% respectively of total global green bond issuance over that period. France and Germany were also significant players, representing 10.3% and 10.1% respectively.

**Figure 20:** Green bond issuance by country, % of global total, 2012-21
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



Looking only at major economies, our analysis shows that all G7 countries' green bond markets exhibited an increasing trend over the past 10 years, and in particular over the past four years.

**Figure 21:** G7 green bond issuance
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




It is likely that the largest green bond markets reflect the very large size of capital markets overall in the world's two largest economies. Therefore, we also undertook analysis on a relative basis, examining cumulative green bond issuance as a share of countries' total bond issuance. The table below shows the countries with the highest penetration of green bond issuance. Mathematically, this relative approach will tend to favour smaller countries with smaller debt capital markets. We have therefore ordered the countries by level of green bond issuance to give more prominence to more sizeable markets. We have also included the US and China in this table, to give a sense of scale and to highlight the point that these countries dominate green bond issuance by huge margins in absolute terms but have negligible levels of green bond penetration. Sweden and Norway stand out as markets with both significant size (albeit three to six times smaller than the US and China) and significant penetration (for their size).

**Figure 22:** Green bond issuance as a % of country's total bond issuance, 2012-21
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Issuer nation | Bond ($m) | Green Bond ($m) | % Green |
|---|---|---|---|
| Sweden | 877,096.2 | 57,768.6 | 6.6 |
| Norway | 408,411.3 | 28,280.3 | 6.9 |
| Chile | 131,522.0 | 9,876.0 | 7.5 |
| Poland | 70,805.8 | 5,653.0 | 8.0 |
| Czech Republic | 38,207.9 | 3,726.0 | 9.8 |
| Mauritius | 5,709.8 | 1,835.0 | 32.1 |
| Iceland | 15,285.3 | 1,252.0 | 8.2 |
| Serbia | 15,000.5 | 1,155.9 | 7.7 |
| Georgia | 4,112.1 | 750.0 | 18.2 |
| Liechtenstein | 4,285.6 | 708.8 | 16.5 |
| China (mainland) | 15,969,424.4 | 186,546.7 | 1.2 |
| United States | 26,422,379.9 | 160,140.1 | 0.6 |

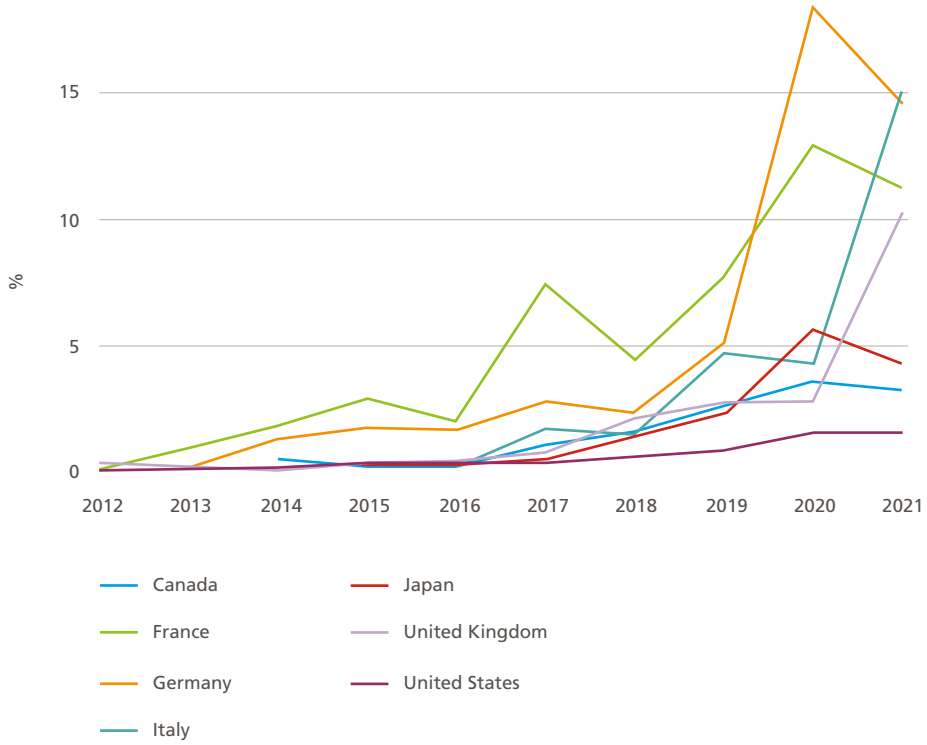
The influence of sovereign green bond issues on the overall market is clearly visible; for example, the French sovereign issues of 2017 and 2021, the German sovereign issue of 2021, and the UK green gilt issues of 2021 have clearly helped drive overall market trends. Except for Luxembourg, public green bond issuance comprised at least half of total green bond issuance for the ten largest green bond issuing nations over 2012-21.

**Figure 23:** Green bond issuance by country and by public/private issuance split and ranked by green bond issuance
Source: TheCityUK analysis based on data from Refinitiv Workspace

| Issuer nation | Total green $m | % of green that is public issuance | % of green that is private issuance |
|---|---|---|---|
| China (mainland) | 186,546.7 | 98.3 | 1.7 |
| United States | 160,140.1 | 85.0 | 15.0 |
| France | 141,326.7 | 53.8 | 46.2 |
| Germany | 139,179.2 | 40.9 | 59.1 |
| Netherlands | 94,348.8 | 91.6 | 8.4 |
| Luxembourg | 69,167.5 | 27.8 | 72.2 |
| United Kingdom | 65,035.5 | 55.0 | 45.0 |
| Sweden | 57,768.6 | 67.2 | 32.8 |
| Japan | 41,475.9 | 82.2 | 17.8 |
| Spain | 40,456.1 | 70.7 | 29.3 |

This point is emphasised when looking at green bond penetration in the G7. Green bonds accounted for around 5% of total bonds across the G7, and less than 1% in the US.

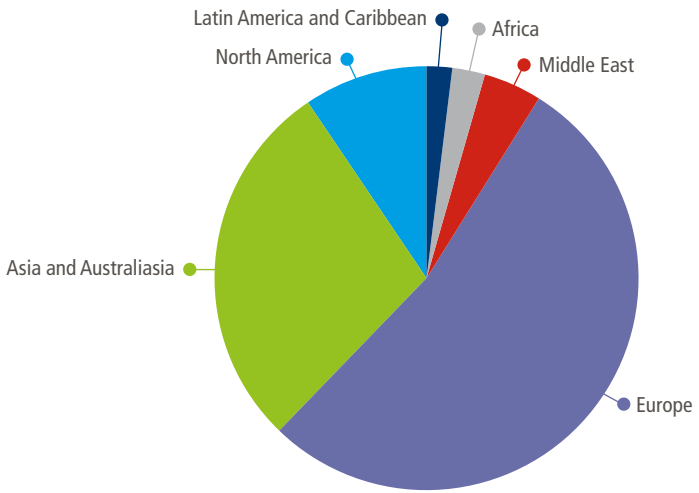
**Figure 24:** G7 green bond issuance as a % of total bond issuance
Source: TheCityUK analysis based on data from Refinitiv Workspace



## Green loans

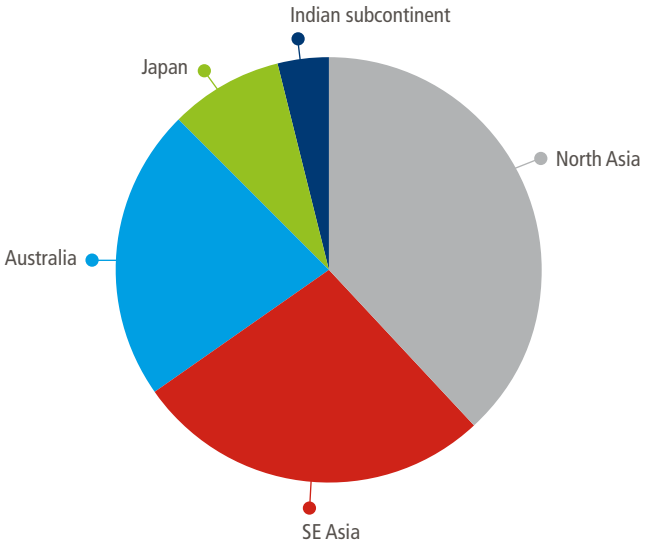
On a cumulative basis over 2017-21, Europe and Asia and Australasia accounted for 53.4% and 28.3% respectively of green lending globally. North America accounted for 9.2% of global green lending.

**Figure 25:** Value of green loans by region, % of global total, 2017-21
**Source:** Dealogic, courtesy of AFME; TheCityUK calculations




Of the $47.7bn of green lending that was in Asia and Australasia over 2017-21, North Asia accounted for 38.1% and Southeast Asia accounted for 27.4%.

**Figure 26:** Value of Asia and Australasia loans by sub-region, % of regional total, 2017-21
**Source:** Dealogic, courtesy of AFME; TheCityUK calculations

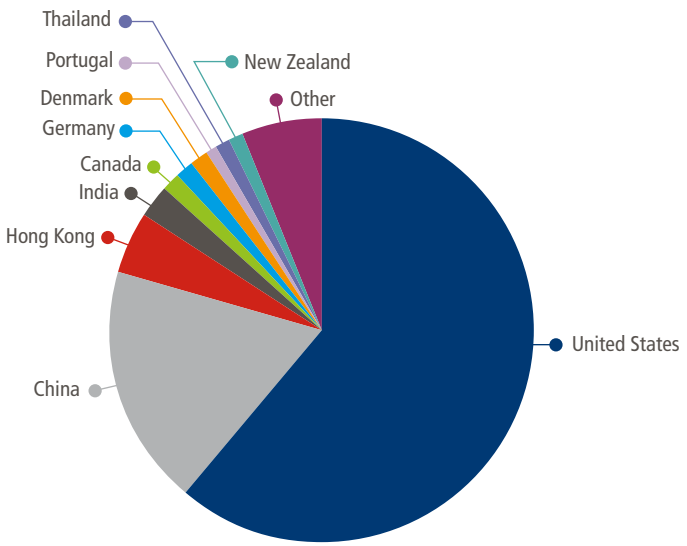



Growth in green lending has also been most prominent in Europe and in Asia and Australasia. Between 2017 and 2021, Europe had the highest increase, with green lending rising from $299m to $76.8bn.

## Equity

Our indicative analysis of green equity market capitalisation uses valuations on 31 December 2021. The results show that—unsurprisingly given it has the world's largest equity markets overall—the US had the world's largest green equity market, accounting for 61.2% of the total. The US and China had the lion's share of the global absolute green market capitalisation value, accounting for nearly 79.6% of the total.

**Figure 27:** Green market capitalisation (as of 31 December 2021), % of global total
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



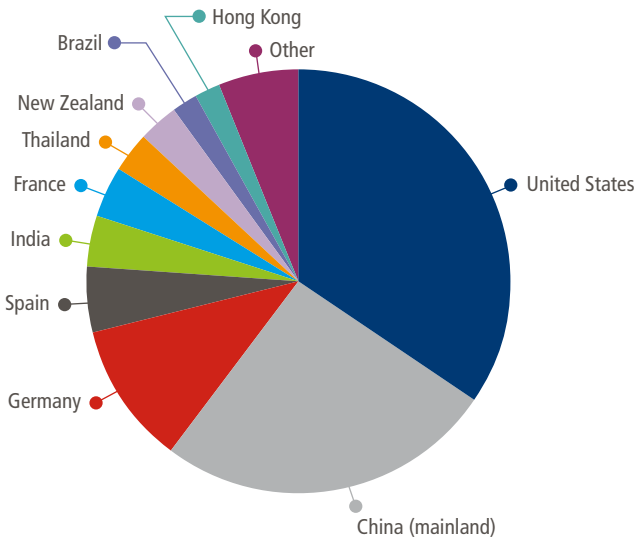

Again, since the analysis in absolute terms is not particularly revealing because of the sheer size of US and Chinese equity markets, we examined market capitalisation in relative terms. Denmark and Portugal stand out as having had relatively high green penetration as of 31 December 2021–noting that Denmark's market capitalisation was eight times greater than Portugal's, meaning that Portugal's penetration rate was much higher, despite the two countries having similar green market capitalisations at that time. The US and China are again included in the table below for comparison.

**Figure 28:** Green market capitalisation as of 31 December 2021, % of total market capitalisation
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Country of exchange | Market cap $m | Green market cap $m | % Green |
|---|---|---|---|
| Denmark | 702,938.0 | 30,758.6 | 4.4 |
| Portugal | 87,310.2 | 24,788.9 | 28.4 |
| Thailand | 599,789.8 | 24,724.2 | 4.1 |
| New Zealand | 128,872.0 | 24,090.4 | 18.7 |
| Norway | 446,536.2 | 14,681.2 | 3.3 |
| Philippines | 278,981.0 | 10,533.4 | 3.8 |
| Peru | 71,479.5 | 2,134.9 | 3.0 |
| Estonia | 6,049.6 | 1,212.8 | 20.0 |
| Bosnia and Herzegovina | 3,271.5 | 237.1 | 7.2 |
| Republic of Serbia | 3,763.0 | 163.9 | 4.4 |
| United States | 57,520,981.2 | 1,491,569.1 | 2.6 |
| China | 15,429,800.8 | 448,522.2 | 2.9 |

Because the market capitalisation data are indicative—presenting only a snapshot of a point in time and highlighting countries with relatively small equity markets—we have also used IPO data to analyse the performance of different countries in terms of green IPO activities. The US, China and Germany dominated green IPO activity, accounting around three quarters of total global green IPOs over 2012-21. The UK was the 11th most active green IPO market, accounting for 1% of the cumulative global total.

**Figure 29:** Green IPOs by country, % of global, 2012-21
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




In relative terms, however (considering green IPOs as a percentage of total IPOs in each country), the US and China had green IPO penetration of only 2% and 1% respectively. The percentage in the UK was 0.3%. Among major economies, Germany, Spain and France were notable for having high green IPO penetration, at 8.6%, 5.8% and 4.9% respectively.

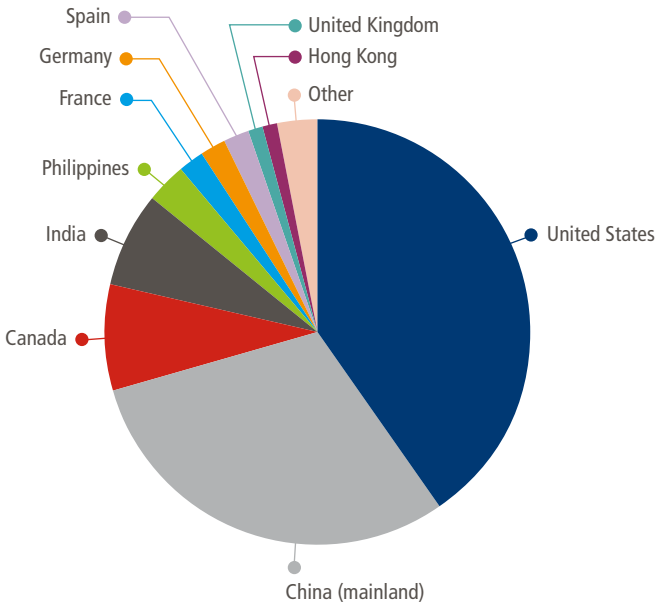
**Figure 30:** Green IPOs as a % of total IPOs, 2012-21
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Country | IPO $m | Green IPO $m | % Green |
|---|---|---|---|
| Germany | 63,325.3 | 5,440.3 | 8.6 |
| Spain | 39,963.2 | 2,309.1 | 5.8 |
| France | 40,657.2 | 1,979.9 | 4.9 |
| New Zealand | 11,814.2 | 1,417.4 | 12.0 |
| Brazil | 55,751.6 | 1,149.4 | 2.1 |
| Ireland | 8,168.7 | 314.0 | 3.8 |
| Vietnam | 5,746.9 | 308.2 | 5.4 |
| Estonia | 546.4 | 203.6 | 37.3 |
| Mozambique | 53.7 | 53.7 | 100.0 |
| Serbia | 7.4 | 7.3 | 98.4 |
| United States | 892,126.1 | 17,747.8 | 2.0 |
| China (mainland) | 1,361,394.9 | 13,252.1 | 1.0 |

## Private equity

Green private equity investment flowed almost entirely into the US, China and Canada, with these three countries accounting for almost 80% of total green private equity investment over 2012-21. The US alone accounted for 40% of the global total. UK-based companies received 1.2% of global green private equity investment.

**Figure 31:** Green private equity investment by country of investee, 2012-21
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



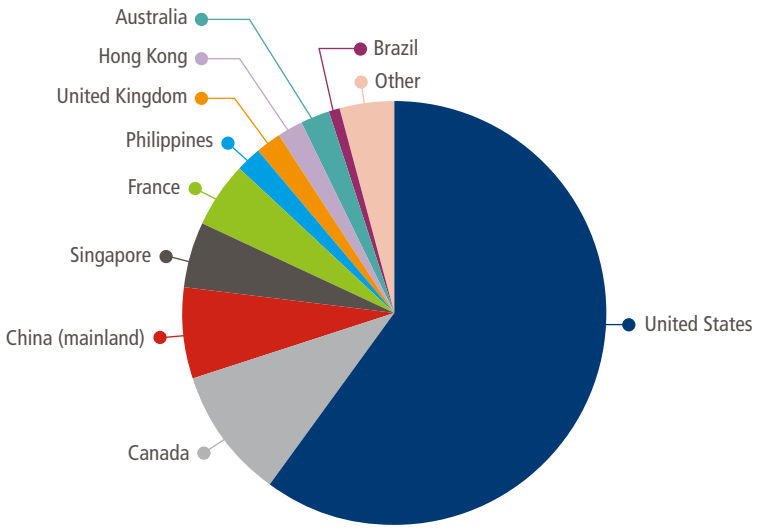

China and Canada also feature prominently when green private equity investment is considered on a relative basis. Green private equity investments channelled to UK companies represented less than 1% of total private equity investments directed to the country.

**Figure 32:** Green private equity investment as a % of country total private equity investment, 2012-21 (investee country)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Investee country | PE $m | Green PE $m | % Green |
|---|---|---|---|
| China (Mainland) | 470,332.6 | 15,037.3 | 3.2 |
| Canada | 151,558.7 | 4,152.2 | 2.7 |
| India | 167,638.1 | 3,618.4 | 2.2 |
| Philippines | 3,767.8 | 1,663.2 | 44.1 |
| Spain | 35,087.0 | 903.1 | 2.6 |
| Hong Kong | 18,312.1 | 599.0 | 3.3 |
| Brazil | 28,684.7 | 560.6 | 2.0 |
| Belgium | 6,947.2 | 116.3 | 1.7 |
| Romania | 309.2 | 17.5 | 5.7 |
| Guatemala | 8.0 | 8.0 | 100.0 |
| United States | 1,757,440.6 | 20,196.6 | 1.1 |

The same countries feature prominently when considering the sources of green private equity investment. The US alone accounted for 60.1% of total green private equity investment over 2012-21. These figures likely reflect the extremely mature state of the US private equity market overall. UK investors accounted for 2.2% of global green private equity investment.

**Figure 33:** Green private equity investment by country of investor, 2012-21
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



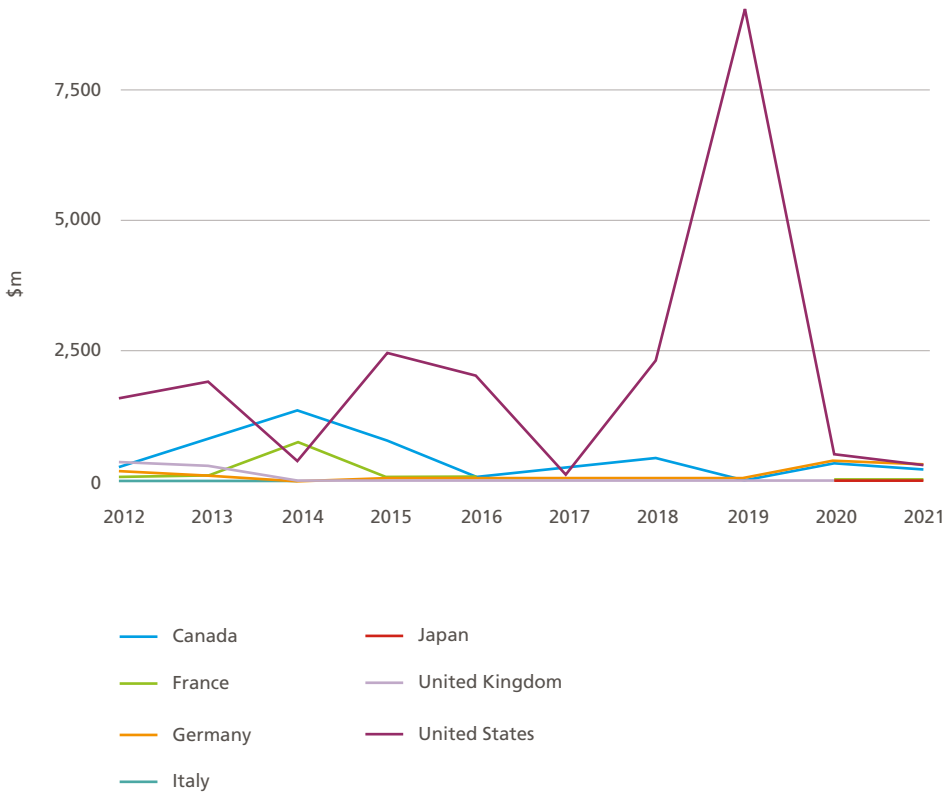

Private equity investors in the Philippines and Costa Rica appear to have been particularly interested in green ventures over the past decade, although the total value of their investments was negligible. Private equity investors in Canada, the US and China chanelled 2.4%, 1.3% and 0.9% of those countries' total private equity investments into green ventures. Canada stands out in this regard; its green private equity investment was six times smaller than the US's, but its total private equity investment was 11 times smaller.

**Figure 34:** Green private equity investment as a % of country total private equity investment, 2012-21 (investor country)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Investor country | PE $m | Green PE $m | % Green |
|---|---|---|---|
| Canada | 180,090.5 | 4,299.2 | 2.4 |
| Singapore | 78,938.2 | 2,300.0 | 2.9 |
| France | 73,170.2 | 1,936.4 | 2.6 |
| Philippines | 1,519.4 | 952.3 | 62.7 |
| Brazil | 7,902.3 | 546.3 | 6.9 |
| Netherlands | 12,566.0 | 229.2 | 1.8 |
| Belgium | 3,995.5 | 194.7 | 4.9 |
| Finland | 2,474.9 | 65.1 | 2.6 |
| Norway | 1,442.2 | 29.2 | 2.0 |
| Costa Rica | 20.9 | 12.0 | 57.5 |
| United States | 2,002,649.7 | 25,608.4 | 1.3 |
| China (mainland) | 350,655.4 | 3,171.2 | 0.9 |

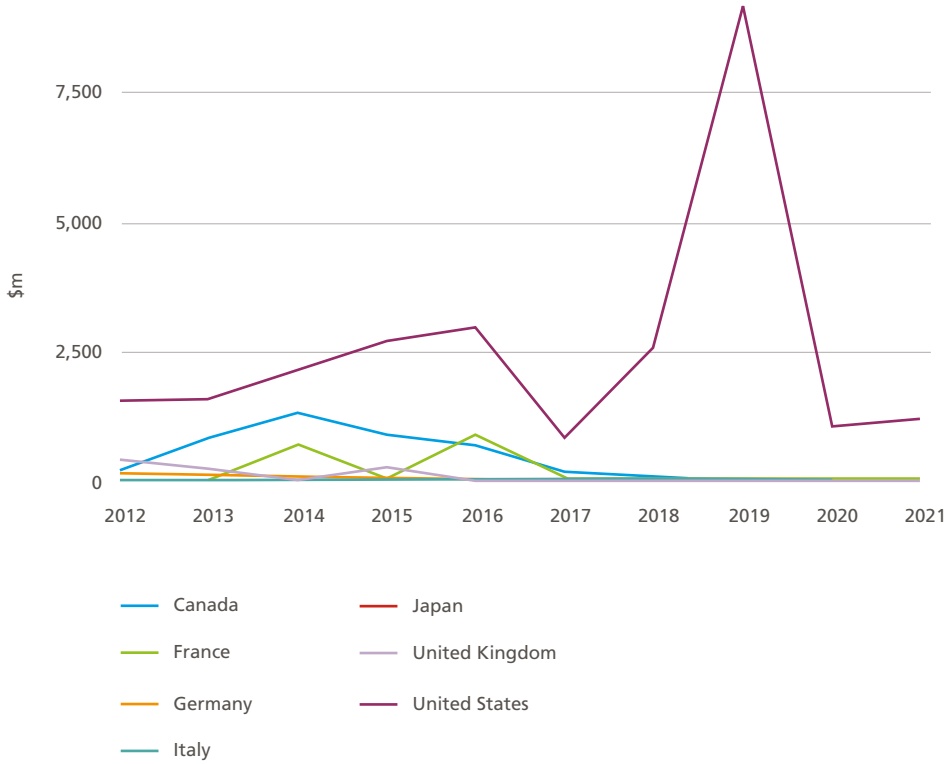
The receipt of green private equity funds by G7 countries was volatile over the past decade. The receipt of green private equity by the US increased sharply in 2018 and 2019 before declining again in 2020-21 to levels in line with those of other G7 countries.

**Figure 35:** Green private equity investment in the G7 (Investee)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



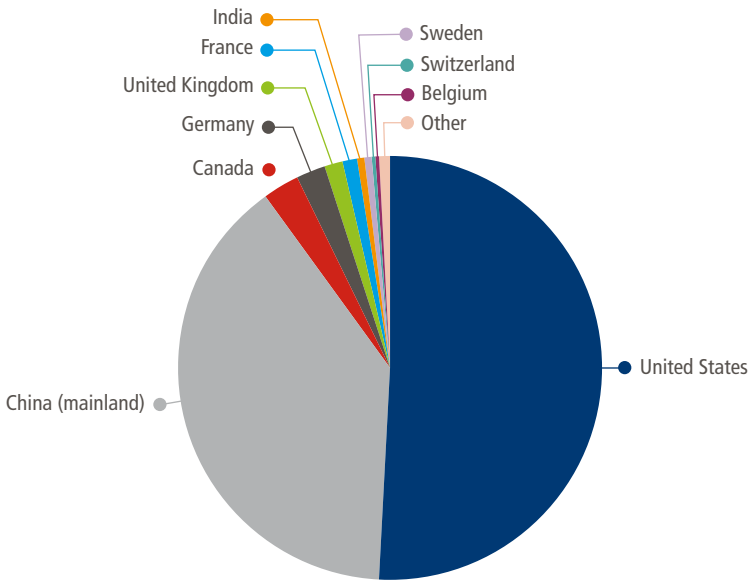

Green private equity investments from the US exhibited a similar trend, indicating that the majority of US green private equity investment is channelled to US businesses.

**Figure 36:** Green private equity investment in the G7 (Investor)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



Green pure venture capital investment comprised the lion's share of private equity (64.6%). The receipt of green pure venture capital investment showed even more geographical concentration than private equity investment overall, with the US and China accounting for nearly the entirety of global green venture capital investment.

**Figure 37:** Green venture capital investment by country of investor % of global total, 2012-21 (Investee)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



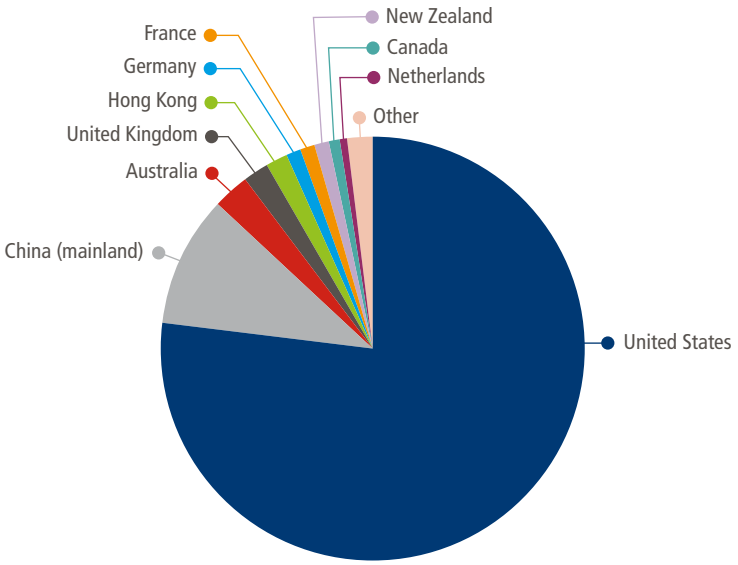

Leaving aside Guatemala, whose only private equity deal over the past decade was a very small green private equity investment directed to the US in 2017, our analysis indicates that green venture capital investment is marginal in the context of markets' overall venture capital activity.

**Figure 38:** Green venture capital investment as a % of country total venture capital investment, 2011-21 (Investee)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Investee country | VC $m | Green VC $m | % Green |
|---|---|---|---|
| United States | 933,809.8 | 16,808.6 | 1.8 |
| China (mainland) | 360,313.7 | 12,772.7 | 3.5 |
| Canada | 37,552.7 | 879.8 | 2.3 |
| Germany | 41,300.9 | 736.3 | 1.8 |
| Sweden | 13,421.9 | 189.3 | 1.4 |
| Switzerland | 8,638.9 | 92.0 | 1.1 |
| Belgium | 3,550.3 | 67.5 | 1.9 |
| Saudi Arabia | 1,220.1 | 16.0 | 1.3 |
| Guatemala | 8.0 | 8.0 | 100.0 |
| Senegal | 264.9 | 3.2 | 1.2 |

What limited green venture capital investment does take place is sourced almost entirely (nearly 90% of the global total) from US- and China-based investors.

**Figure 39:** Green venture capital investment by country of investor % of global total, 2012-21 (Investor)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



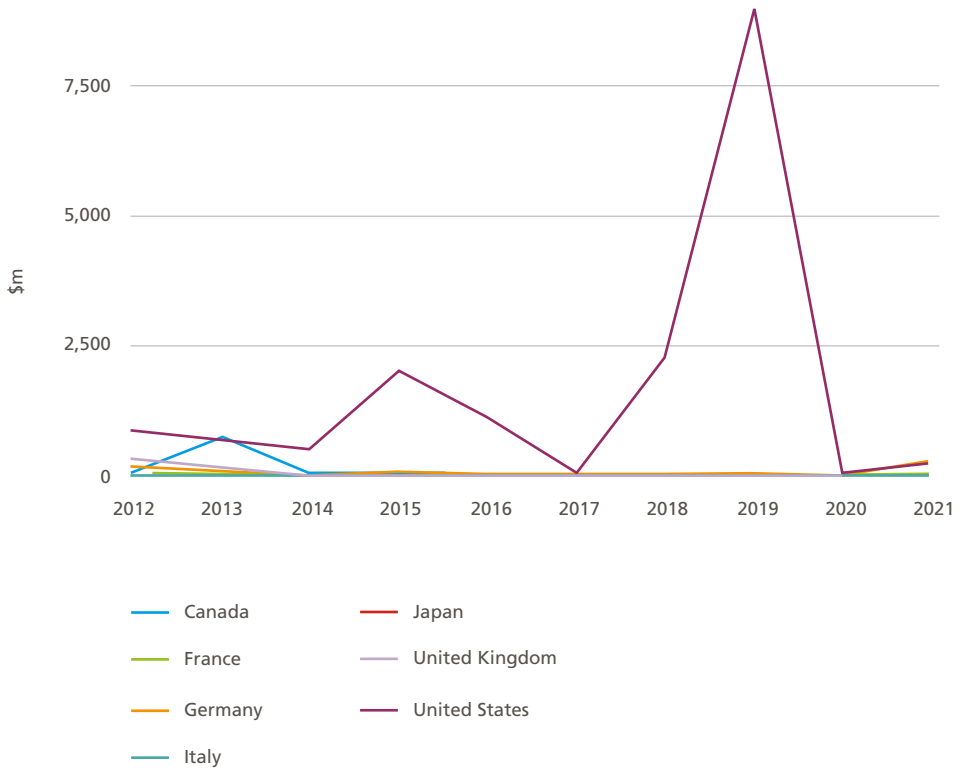

The US and Australia stand out as green venture capital investor nations, noting that overall venture capital investment from the US was 130 times greater than from Australia.

**Figure 40:** Green venture capital investment as a % of country total venture capital investment, 2012-21 (Investor)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace

| Investor country | VC ($m) | Green VC ($m) | % Green |
|---|---|---|---|
| **United States** | 1,053,559.4 | 19,755.9 | 1.9 |
| **Australia** | 8,080.9 | 715.8 | 8.9 |
| **New Zealand** | 408.4 | 192.0 | 47.0 |
| **Netherlands** | 6,063.0 | 118.2 | 1.9 |
| **Belgium** | 3,052.3 | 70.0 | 2.3 |
| **Finland** | 1,967.2 | 65.1 | 3.3 |
| **Philippines** | 265.5 | 62.3 | 23.5 |
| **Norway** | 2,008.5 | 29.2 | 1.5 |
| **Saudi Arabia** | 654.9 | 16.0 | 2.4 |
| **Costa Rica** | 30.5 | 12.0 | 39.4 |
| **China (mainland)** | 269,403.1 | 2,643.5 | 1.0 |

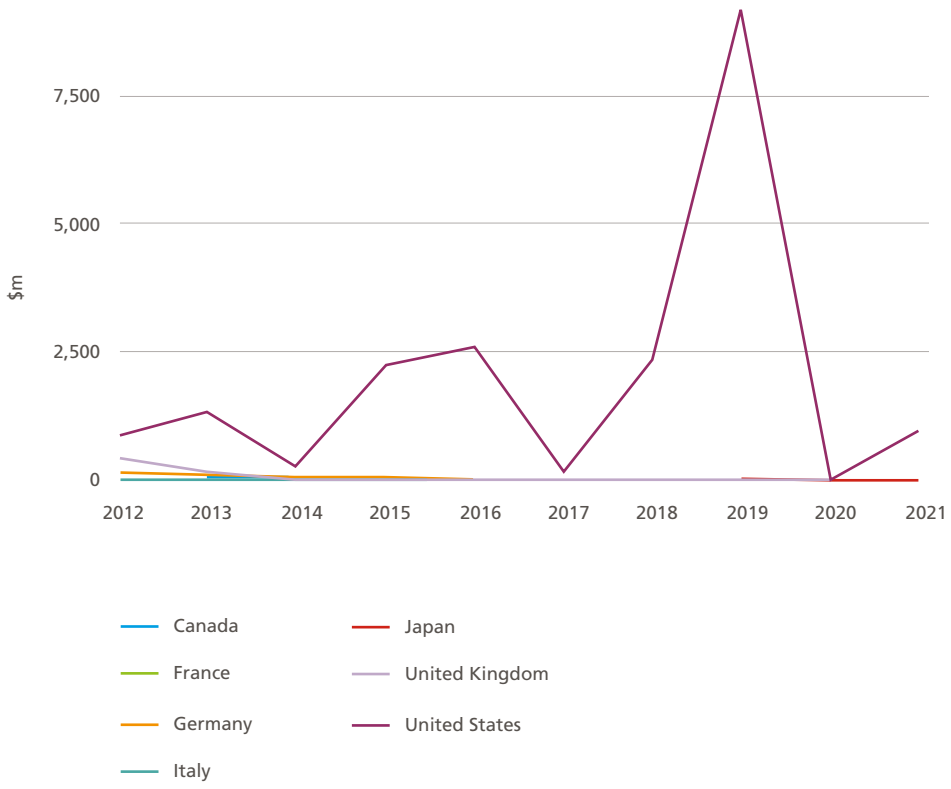
Even among G7 countries, green pure venture capital investment is negligible, with the US being the only country to record any significant activity in this area.

**Figure 41:** Green venture capital investment in G7 countries (Investee)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace




This holds true when considering green pure venture capital by investor source country as well, indicating again that the majority of US investors channelled their funds to US businesses.

**Figure 42:** Green venture capital investment in G7 countries (Investor)
**Source:** TheCityUK analysis based on data from Refinitiv Workspace



# The role of the wider ecosystem in green finance

Professional services related to financial services—that is, legal, management consulting and accounting—complete the wider green finance ecosystem. The UK's well-established strengths in these sectors may help enhance the UK's international position in green finance.

Many multinational management consulting firms that have offices in the UK, such as Accenture, McKinsey & Company and Boston Consulting Group (BCG), are likewise involved in business activities in green and sustainable finance. For example, Accenture partnered with Microsoft to accelerate the UK's transition to carbon neutrality by using open data, artificial intelligence (AI) and a digital skilled workforce in February 2021.[19] Besides large management consulting companies, there exist a wide range of smaller-sized environmentally-focused consultancies headquartered or having offices in the UK. For example, UK-based Green Element, and South Pole, which is based in Switzerland but has an office in London, provide environment-related consulting services to their clients. Meanwhile, as of September 2020, 30 UK management consulting companies were certified as B Corporations. One of the aims of certified B Corporations are to ensure that business entities meet the highest standards of social and environmental performance.[20]

Professional services bodies are also working to advance knowledge and training in green finance. The Green Finance Education Charter brings together 13 professional bodies, including the Chartered Banker Institute, Chartered Institute for Securities & Investment, ICAEW, ICAS, and the London Institute of Banking and Finance, to "integrate green and sustainable finance principles into the education and training programmes of finance professionals worldwide".[21] Given the ongoing and well-known challenges around the lack of standardised green finance data, accounting firms potentially have a particularly important role to play in the further development of green finance. These firms can contribute to the presentation of "comparable information across firms and over time".[22]

19 Alva, 'ESG report: Professional services', (December 2020 – February 2021), p.2

20 Consultancy.uk, '30 UK management consulting firms certified as B Corporations', (22 September 2020), available at: https://www.consultancy.uk/news/25640/30-uk-management-consulting-firms-certified-as-b-corporations

21 Green Finance Institute, 'What is the green finance education charter?', available at: https://www.greenfinanceinstitute.co.uk/green-finance-education-charter/

22 ACCA, 'The important role of accountants in shaping a greener future', (30 July 2020), available at: https://jobs.accaglobal.com/article/as-the-covid-19-crisis-highlights-the-fragility-of-the-global-economy-green-finance-gets-a-boost-ug/

**Figure 43:** The UK's green finance ecosystem

**Source:** City of London Corporation[23]

| Participants | Roles in sustainable finance | UK's strengths and offers |
|---|---|---|
| **Government and regulators** | Build a 'green' financial system through policy and regulations to drive momentum for sustainable finance | • Targeted policies and regulations to systematically change the financial system<br>• Thought leadership by promoting best practices in the UK and internationally |
| **Market infrastructures and domestic standard-setting bodies** | Provide platforms and tools to commercialise and scale up sustainable finance | • Pioneers in innovations of platforms and tools<br>• Ideal location for knowledge exchange<br>• Thought leadership through standard setting and promoting ESG integration |
| **Investors and investment managers** | Invest with sustainability considerations and invest for positive impacts | • Great size and depth of international capital pool<br>• Strong capability in implementing sustainable investment strategy |
| **Corporates and issuers** | Supply green finance opportunities by developing qualified projects and products | • Strong ESG awareness and integration<br>• The hub for both UK and international issuers |
| **Professional services providers** | Provide supporting services to investors and issuers | • The global financial centre with top talent and expertise in sustainable finance<br>• Innovative solutions for sustainable finance |

23 City of London Corporation, 'Championing sustainable finance: the UK's global offer', July 2021, available at: https://www.theglobalcity.uk/PositiveWebsite/media/Research-reports/COL_Sustainable-Finance-Opportunities_Accessible-final.pdf

# Conclusion

TheCityUK has undertaken research to analyse the green finance market over the past decade. Global green finance has grown significantly over 2012-21, but it still constitutes a minuscule part of total global finance, accounting for only 4.1% in 2021. To date, green finance is almost entirely synonymous with green bonds. Our research presents an important and unprecedented quantitative assessment of the state of the green finance market globally and in the UK. However, it is—necessarily—an incomplete picture, for two reasons. First, definitional limitations mean that not all green finance activity is captured in our data (for example, transition finance is not necessarily included). Second, there is no way to systematically quantify small private investments, or finance that is green but not labelled or defined as such.

When considering global green finance markets, the world's largest economies (the US and China), with their outsize capital markets, tend to have the most green finance activity in absolute terms. Although our alternative assessment examining green finance penetration mathematically favours smaller countries with smaller capital markets, some European countries—notably Sweden and Germany—stand out as having significant green finance activity in the context of their relatively smaller size.

In the UK, green finance has similarly grown rapidly from a low base. Going forward, activity is likely to be spurred by the inaugural green gilt issuance of 2021. Moreover, the UK's global financial and related professional services ecosystem and its position as one of the world's leading international financial centres means that it is well-placed not only to offer the whole range of green finance products and services, but also to demonstrate and promote this proposition through collaboration between the government, financial and related professional services firms, and the wider corporate sector.

# Methodology

The majority of the data in this report was sourced from Refinitiv Workspace. As Refinitiv continually updates its database, TheCityUK extracted and stored the data required for its analysis in its own database for reproducibility and transparency purposes.  All data were extracted between 26 January and 3 February 2022 and the data and information in the report is accurate as of 3 February 2022.

With respect to green bond data, TheCityUK filtered for green bond deals that were issued by agencies following their own green bond principles but were certified by Climate Bonds Initiative (CBI) or by agencies following CBI principles. The category 'Proceeds Amount inc. overallotment sold – this market', which included the value of green tranches of green bonds, was used to carry out our analysis.

For green market capitalisation, green IPOs, and green private equity, TheCityUK used the following Workspace categories to extract data for green financing:

1. Renewable fuel
   - Renewable Fuels (NEC)
   - Biodiesel
   - Ethanol Fuels
   - Pyrolytic & Synthetic Fuels
   - Biomass & Biogas Fuels
   - Hydrogen Fuel
2. Renewable Energy Equipment & Services
   - Renewable Energy Equipment & Services (NEC)
   - Wind Systems & Equipment
   - Stationary Fuel Cells
   - Photovoltaic Solar Systems & Equipment
   - Thermal Solar Systems & Equipment
   - Biomass Power Energy Equipment
   - Waste to Energy Systems & Equipment
   - Hydropower Equipment
   - Wave Power Energy Equipment
   - Renewable Energy Services
   - Geothermal Equipment

3. Carbon Capture & Storage
4. Electric (Alternative) Vehicles
5. Sustainable & Energy Efficient Home Builders,
6. Organic Farming
7. Independent Power Producers
   - Independent Power Producers (NEC)
   - Renewable IPPs
8. Power Charging Stations
9. Alternative Electric Utilities
10. Hydroelectric & Tidal Utilities
11. Solar Electric Utilities
12. Wind Electric Utilities
13. Biomass & Waste to Energy Electric Utilities
14. Geothermal Electric Utilities

For green private equity data, 'sum of equity invested in search range' filter was used. With respect to green venture capital data, the extracted data only contained pure venture capital deals, which only include investments in start-up/ seed, early, expansion, and later stage deals. Similarly, the 'sum of equity invested in search range' column was used to carry out our analysis of green venture capital activities.

TheCityUK gratefully acknowledges ICE for the provision of green bond underwriting data and AFME for the provision of green loan data. The green loan data was denominated in Euros, and TheCityUK used daily exchange rate data from the Federal Reserve Economic Data database to convert the data into US dollars.[24] The data included missing values, which TheCityUK imputed by replacing the missing values with the annual average exchange rate of each corresponding year. After the imputation of missing values, the annual exchange rate was then recalculated as the average value of all daily exchange rates of each year.

24 Available at: https://fred.stlouisfed.org/series/DEXUSEU

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