A deep dive into the world of climate fintech with firstminute Capital

Climate fintech is a cross-cutting sector covering the intersection of climate, finance and digital technology. It includes a range of financial product innovations, applications and platforms that serve as mediums between all stakeholders to catalyse decarbonisation.

Temps de lecture : minute

7 February 2022

Climate change poses substantial economic and political risk to the global economy. Efforts to mitigate such risk will require a fundamental retooling of our global economy and coordinated action across public and private stakeholders. Financial services institutions play critical roles, however incumbents in banking, insurance and finance are slow to innovate. Their legacy technology infrastructure and business models don't lend themselves to iteration and innovation.

Conversely, fintech has shown its ability to drive innovation and to reach venture scale. Financial product innovation and applied technologies such as big data, artificial intelligence, distributed ledger technologies make capital availability, data gathering and processing much faster, transparent and cost effective. As a result, they have important roles as enablers and disruptors within climate change.

The climate transition requires financial sector innovation in multiple areas:

- Facilitating the shift of investment dollars towards renewable energy and away from oil & gas
- Tools for tracking emissions and changing behaviour at the business/consumer level
- Financing of new infrastructure for energy and transport
- Management and mitigation of climate risks

Read also
Why is everyone so excited about climatetech?

Market size

Financing requirements for the transition to a low-carbon economy and for meeting the objectives of the Paris Agreement (limit the global temperature rise to below 2C from pre-industrial levels, and pursue efforts

to limit it to 1.5C) are estimated to be in the range of $3–$5T of investment per year globally over the next 30 years for the decarbonisation of _10 sectors representing 75% of global emissions_. This is an increase of five to eight times from the current market for climate finance which is estimated at $600B.

Additionally, climate finance needs are expected to not be linear over the next three decades as a lack of urgent action today will result in higher future investments. In this framework, policy and regulatory changes will play a key role in driving change in the financial services ecosystem.

The fintech market represents a small percentage of the overall financial services sector, however it is growing rapidly and driving change across the industry. The global fintech market is projected to grow steadily at a compound annual growth rate (CAGR) of about 23% reaching a _market size value of $324B by 2026_. Climate fintech is set to play a major role within a fast-growing space.

Business models

A wide range of business models across multiple verticals are emerging, applying a mix of already proven technologies.

Business Models and Applied Technologies

Below are Climate Fintech business models which have been sorted based on their application within the financial system. Additionally, we have color coded these business models per the key on the right side, based on the applied technology or framework which is most commonly used by the business model.

Key (applied technology):

- Big Data
- Artificial Intelligence (AI)
- Blockchain
- Internet of Things (IoT)
- Cloud Computing
- Crowdfunding
- Open Banking

Payments — Consumer Behavior

Paperless Digital Payments	Carbon Offset Gamification	Sustainable Ecommerce	Carbon Spending Trends & Tracking

Banking — Retail & Commercial

Carbon Offset Customer Deposits	Climate Crisis Credit Cards	Green Credit Management System	Supplemental "Green" Banking Products

Lending — Debt Financing

Crowdlending & P2P Lending	Cleantech Leasing Programs	Pay-As-You-Go Microgrids	EV Auto & Home Efficiency Credit Analysis	Renewable Project Finance Underwriting	Green Bond Issuance & Syndication

Investing — Equity Financing

Equity Crowdinvesting	Sustainable Portfolio Construction (Robo Advisors)	Passives Product Creation	Active Thematic Fund Creation	Asset Valuation & Pipeline Services

Trading — Carbon & Energy

Emissions Marketplaces	Cap & Trade Pricing Models	Carbon Offset Project Onboarding	Energy Trading / Grid Management	Energy Mix Pricing Models

Risk Analysis — Research

ESG Data Analytics	1.5° Scenario Modeling	Scope 1, 2, 3 Carbon Accounting	Physical Risk Analysis	Transition Risk Analysis

Insurtech — & Financial Products

Solar Revenue Put	Proxy Revenue Swap	Catastrophe Bonds	Property, Casualty, and Weather Damage Risk Pricing	Satelite Analysis & Automated Claims Management

Regtech — Reporting & Accounting

Platforms to Integrate PCAF, TCFD, CPA, SASB, CDP Reporting	End Client Impact Reporting	Shareholder Advocacy & Voting	Annual Reporting and Regulatory Compliance	Energy Auditor Grading Systems

Please note that we have not conducted a comprehensive survey and the mapping makes no claim for completeness. It is rather a first step for a monitoring and exploration of the Climate Fintech Landscape.

Verticals

Payments

The overall impact of consumers surpasses in scale the actions of the largest investors, resulting to be one of the strongest catalyst for sustainable change.

The volumes of mobile payment transactions reached $51T in 2019, an increase of over 28 times from six years ago. The convenience of digital payments has enabled adjacent sustainable solutions tied to consumer spending tendencies. Spending behaviour is indeed strongly tied with carbon emissions, and the conscious consumer needs to be provided with tools to make sustainable decisions.

Innovation efforts to help citizens transact in ecologically-minded ways present great opportunities across industries: most airline carriers today present carbon-offsetting options, ecommerce marketplaces offer eco-friendly packaging and shipping, while digital consumer payments channels such as Alipay and WeBank are developing ways to encourage consumers to adopt green practices via their mobile payments platforms.

Banking

Within the financial services ecosystem, retail and commercial banks are uniquely positioned to foster sustainable practices by integrating educational solutions and financing mission-driven projects.

- Retail Banking. Retail banking has faced a fundamental wave of disruption in the last decade due to the rise of convenient and accessible solutions developed by challenger banks. Adoption of such platforms skyrocketed thanks to attractive personal finance offerings

including low rates, high user experience and ample services range. The agility of neobanks combined with their wide adoption across the young generations places them in a unique position to develop ethical, transparent and simple products which have a positive environmental impact. These include solutions such as decarbonisation tracking of shopping, automatic offsetting of purchased items and tree planting credit cards.

- Commercial Banking. Applications of commercial banking for decarbonisation revolve around credit analysis and project financing for renewable energy, electrification and resource efficiency businesses. Banks innovating in the space leverage AI to parse alternative data to help design eco-friendly lending models and issue green bonds.

Lending

Debt financing plays a key role in facilitating investments and enabling projects. The majority of large infrastructure projects are financed with debt rather than equity. In the renewable energy sector, the deal structuring is driven by tax incentive structures and the digitisation of this process has benefited from several fintech solutions. These include new lending structures such as P2P lending for capital accessibility, AI and big data models for credit analysis and Blockchain-based platforms for transparent and intermediaries-free green loan issuance.
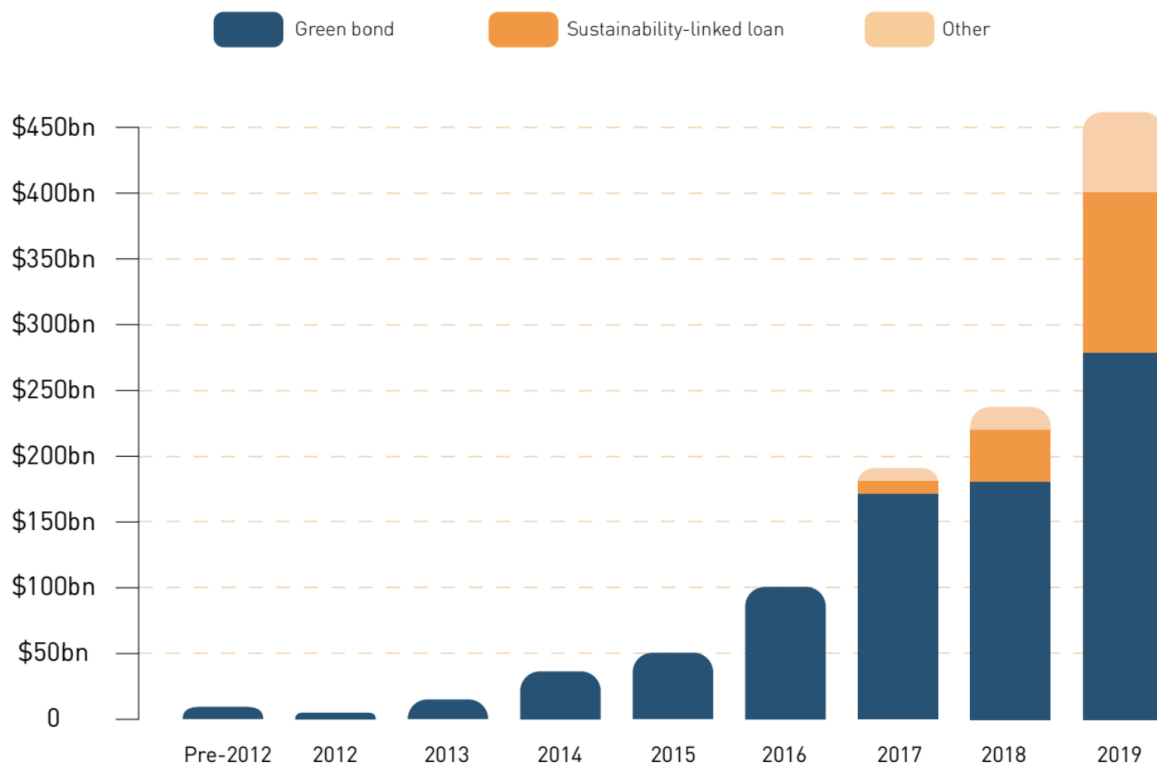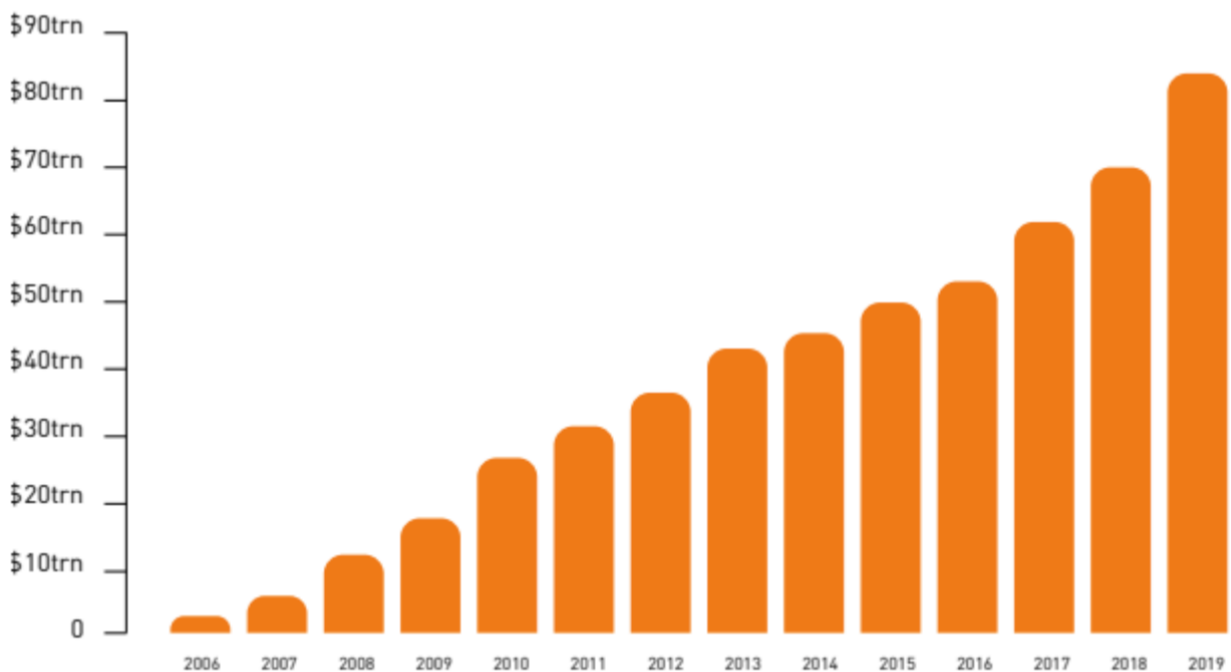
Investing

Sustainable investing is an established category and assets under management are growing steadily. _Global ESG assets are on track to exceed $53T by 2025_. The growth of ESG investment is driven by multiple factors, including regulatory pressure, increased sustainability-related education of the population, shift of capital to the younger generation, decreasing fees and superior returns performance, with the majority of ESG funds outperforming the wider market over the last decade.

Asset managers and owners are leading the movement presenting $100T in AUM as members of the Principles of Responsible Investment (PRI), with many also signing the Net-Zero Asset Owner Alliance. This shift in

investment strategy implies a strong climate impact, with moving a pension to a more sustainable fund being 27 times more effective in reducing carbon footprint than being vegan and not flying combined.
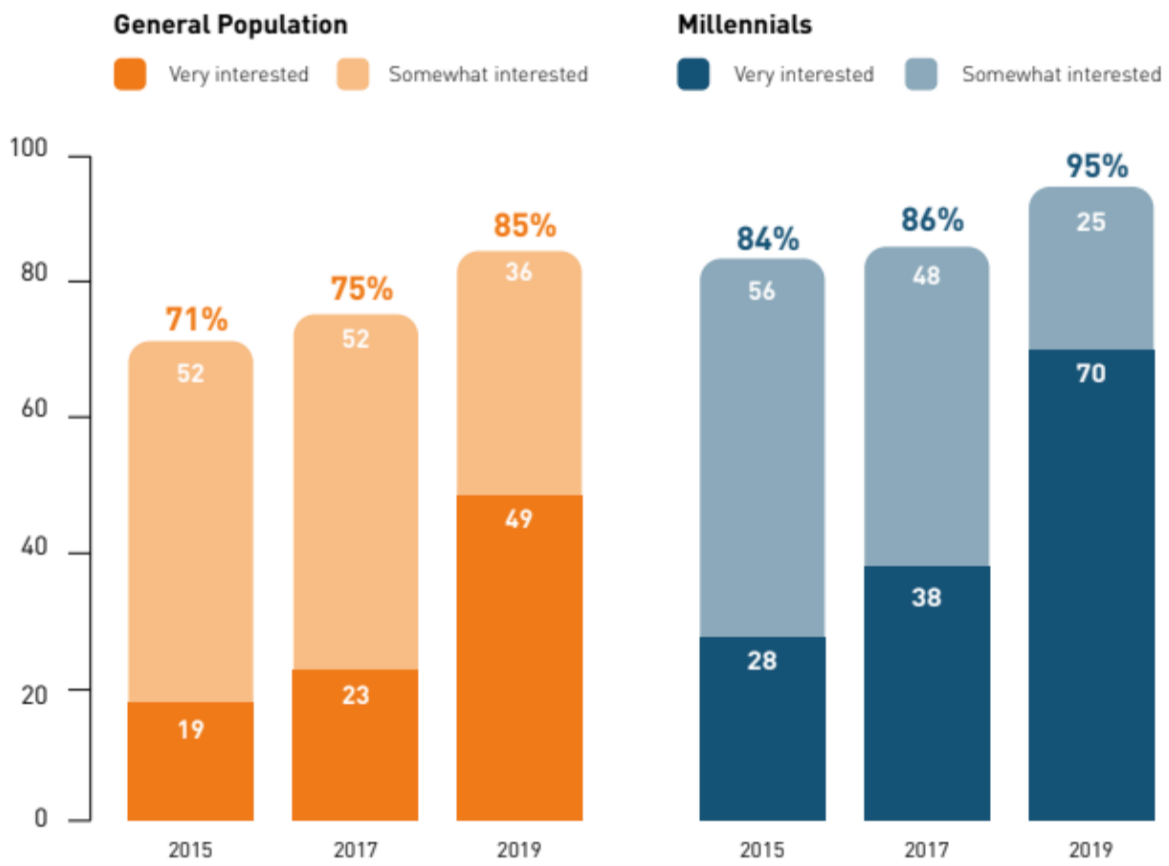
Sustainable investing is increasingly facilitated by the proliferation of enabling platforms, including investment marketplaces for average consumers, robo-advisors, AI-driven software adopted by wealth managers and financial institutions to optimise portfolio management for carbon accounting.

Responsible Investment Assets Under Management, Global, 2006-2019

Source: Generation investment management, Principles of Responsible Investing (PRI)

Interest In Sustainable Investing Jumps In 2019

General Population
- Very interested
- Somewhat interested

Millennials
- Very interested
- Somewhat interested

General Population

Year	Very interested	Somewhat interested	Total
2015	19	52	71%
2017	23	52	75%
2019	49	36	85%

Millennials

Year	Very interested	Somewhat interested	Total
2015	28	56	84%
2017	38	48	86%
2019	70	25	95%

Source: Morgan Stanley. Data as of November 2019.

Risk management

Risk management is at the core of investing, with risk being correlated to financial reward. In today's ever changing world, dividends derived from GHG intensive activities are offset by substantial sustainability risks. These include events such as policy changes, physical climate-induced destruction and financial penalties for unethical business behaviour.

In this context, climate risk analysis does not imply fighting climate change but rather ensuring the maximum return on investment despite climate change. This usually is achieved by implementing green practices such as adopting more net-zero business practices, investments into

renewable energy and divestments into GHG-intensive activities.

The emergence of Big Data has allowed for superior collection, processing and analysis of risk data. The collection of large data gathered from edge computing devices such as sensors and satellites and from more traditional technologies such as Cloud and public databases has fostered new enriched datasets for processing and insights extrapolation. Risks associated with floods, rising sea level, deforestation, wildfires can be automatically factored into the risk analysis of projects and investments, ultimately impacting the allocation and cost of capital.

Trading

Green trading practices can be divided into two main categories: carbon trading, which includes emissions exchanges, and energy trading, which involves the exchange of distributed energy using smart grids.

- Carbon Trading. Emissions and carbon trading has become an established practice to put a price on carbon emissions and pollution and incentivise projects which offset such emissions. Cap-and-trade emissions trading schemes allow governments to allocate allowances to corporations, who can in turn buy and sell these on the open market. To keep the planet to 1.5C, all future net emissions of carbon dioxide from 2018 need to be limited to 570 gigatons. At the current pace, the world would exceed the target by 2031. Carbon markets play a fundamental role in achieving this global objective.
- Energy Trading. Power grids have traditionally been centralised systems whereby utilities control the flow of electricity based on demand of passive consumers. The proliferation of renewable energy sources has induced more flexible and decentralised energy infrastructures, helping to avoid line loss effects caused by the dissipation of energy across long transmission lines. The resulting network transformation from a centralised grid to a network of local

microgrids has contributed to shifting the management responsibilities back to local communities. Decentralised energy systems are projected to account for roughly 25% of the energy market by 2050.

Interconnected decentralised microgrids are known as smart grids, where electricity flow is decided using technological solutions such as smart meters, smart appliances and renewable energy sources. Innovation around smart grids present a lot of promise, with improving the US electricity grid by 5% being equivalent to eliminating the fuel and carbon emissions of 53M cars.

Data analytics and reporting

As the flow of capital increases towards decarbonisation, accurate carbon data and reporting is pivotal ensuring systematic financial supervision and providing actionable insights to private and public stakeholders. Spending on ESG data is projected to approach $1B this year, and it has grown at an annual growth rate of 20%. ESG data & reporting for the investment sector alone is projected to reach $2.54B by 2031.

Such growth is facilitated by international efforts to align climate monitoring and taxonomies between corporates and states within agreed frameworks. In this context, the Task Force on Climate-related Financial Disclosures (TCFD) and the Partnership for Carbon Accounting Financials (PCAF) play important roles: the former providing high-level principles for climate-related risks and opportunities and the latter developing an accounting tool to monitor financed emissions.

Insurtech

Insurance companies are the largest group of asset owners on the planet after pension funds with over $30T in AUM. They play a fundamental systemic rule as risk managers, risk carriers and investors. However, they

are regularly impacted by the climate-induced events, with climate change being recognised today as a severe threat for the insurance industry due to the risk imposed to their assets (such as real estate) and, more importantly, due to the increased number of policy holders' claims.

As risk managers, insurance companies have access to the latest climate models which are used as inputs to their catastrophe risk models and loss-prevention systems, reducing costs of labour and maximising speed of claims payments. As incumbents in the space are usually capable to build their own internal systems, a new wave of fintech startups has started developing systems targeting small and medium-sized insurance companies to provide their own technology services.

Crypto and Blockchain

Decentralised technologies have the potential to foster sustainability-related changes by exploiting the benefits of blockchains, such as immutability and transparency. Nevertheless, concerns around Bitcoin's carbon footprint have made headlines as the proof-of-work consensus algorithm requires large amounts of energy to sustain the mining process.

Despite the controversy, blockchains are considered vital enablers in tracking carbon emissions and consumptions. Firstly, they allow smart energy distribution to take place, verifying how utility companies have redistributed their overproduction of energy, all while reducing costs and increasing trust among stakeholders.

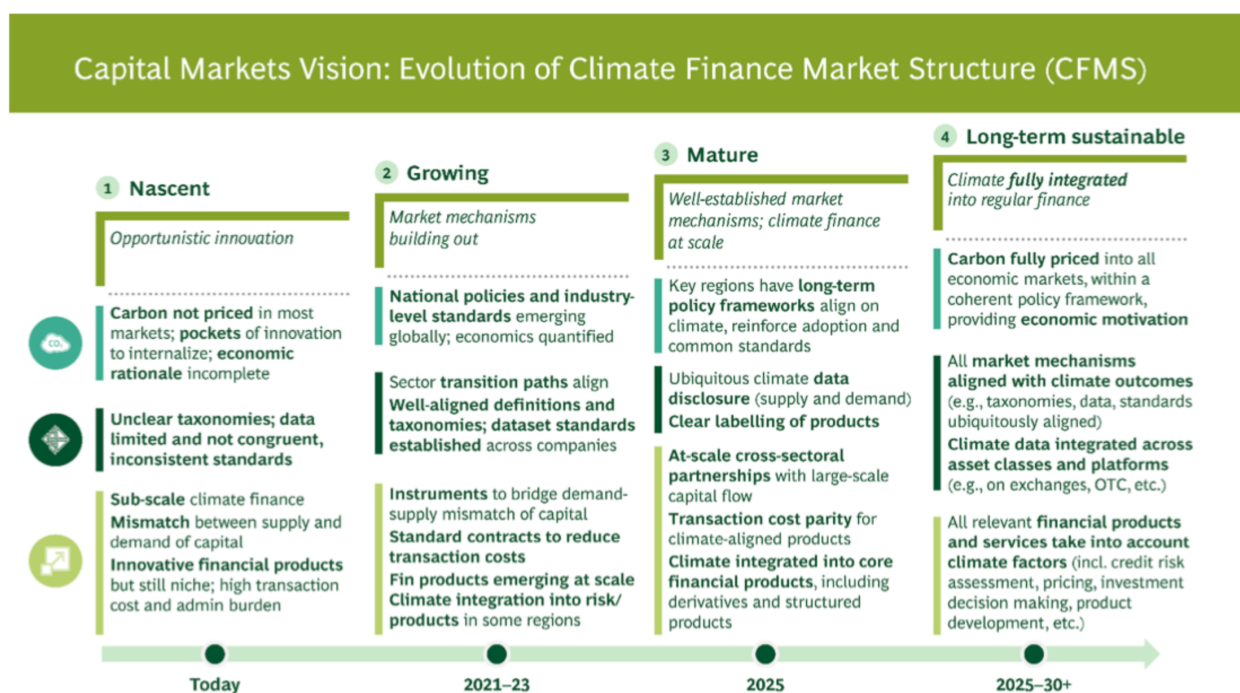Secondly, banks have already started to implement blockchain technology to help with green bonds issuance by creating smart contracts with built-in encryption features, making a transfer of value virtually fraud-proof. Thirdly, new projects are being developed, such as AirCarbon Exchange, focusing on securitising carbon credits into fungible and tradable securities with transparent pricing and real-time settlements.

Finally, recent decentralised autonomous organisations, such as Klima DAO, have started obtaining traction by accelerating the price appreciation of carbon assets, forcing companies and economies to rapidly adapt to low-carbon technologies and carbon-removal projects.

Market landscape

According to New Energy Nexus, a December 2020 survey identified 250 climate fintech companies globally. The climate fintech market is in its early stages and growing, with over 75% of companies having raised USD $10M or less. The ecosystem is ripe for investment and further growth.

For climate fintech, increasing data availability and policy changes are creating space for growth, however the taxonomies, data standards, and national and industry policies are still being established. This creates market uncertainty but is a significant opportunity as coordination increases to define stronger market structures.

Capital Markets Vision: Evolution of Climate Finance Market Structure (CFMS)

1 Nascent

Opportunistic innovation

Carbon not priced in most markets; **pockets** of innovation to internalize; **economic rationale** incomplete

Unclear taxonomies; data limited and not congruent, inconsistent standards

Sub-scale climate finance **Mismatch** between supply and demand of capital **Innovative financial products** but still niche; high transaction cost and admin burden

Today

2 Growing

Market mechanisms building out

National policies and industry-level standards emerging globally; economics quantified

Sector **transition paths** align **Well-aligned definitions and taxonomies; dataset standards** established across companies

Instruments to bridge demand-supply mismatch of capital **Standard contracts to reduce transaction costs** **Fin products emerging at scale** **Climate integration into risk/ products** in some regions

2021–23

3 Mature

Well-established market mechanisms; climate finance at scale

Key regions have **long-term policy frameworks** align on climate, reinforce adoption and common standards

Ubiquitous climate **data disclosure** (supply and demand) **Clear labelling of products**

At-scale cross-sectoral partnerships with large-scale capital flow **Transaction cost parity** for climate-aligned products **Climate integrated into core financial products**, including derivatives and structured products

2025

4 Long-term sustainable

*Climate **fully integrated** into regular finance*

Carbon fully priced into all economic markets, within a coherent policy framework, providing **economic motivation**

All **market mechanisms aligned with climate outcomes** (e.g., taxonomies, data, standards ubiquitously aligned) **Climate data integrated across asset classes and platforms** (e.g., on exchanges, OTC, etc.)

All relevant **financial products and services take into account climate factors** (incl. credit risk assessment, pricing, investment decision making, product development, etc.)
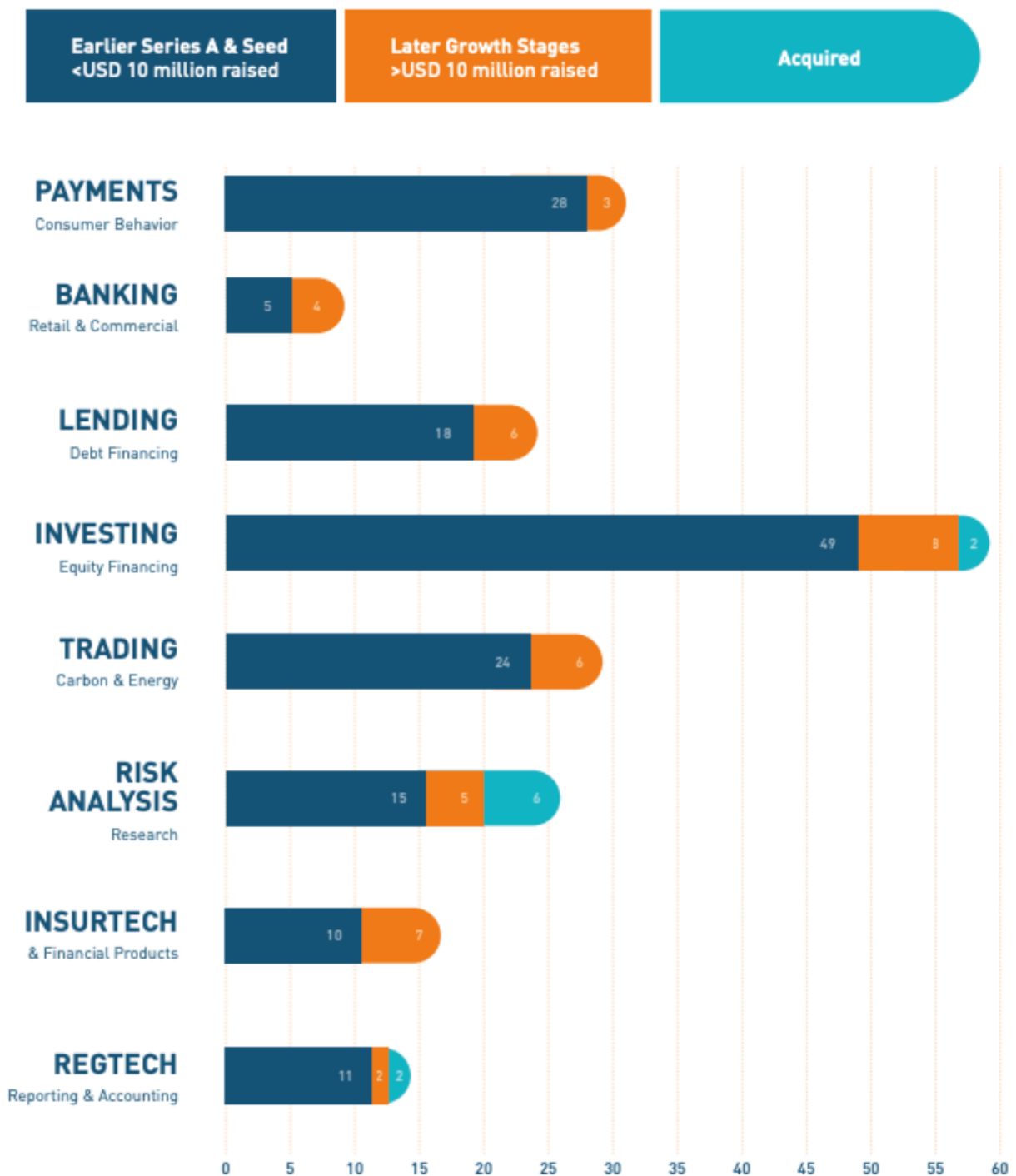
2025–30+

Exits

Among the data sample considered, the highest number of exits, with these having been acquisitions, has been recorded in the risk analysis and management space.

Valuation Trends

Valuations and Ecosystem Trends

	Earlier Series A & Seed <USD 10 million raised	Later Growth Stages >USD 10 million raised	Acquired

PAYMENTS
Consumer Behavior
28 | 3

BANKING
Retail & Commercial
5 | 4

LENDING
Debt Financing
18 | 6

INVESTING
Equity Financing
49 | 8 | 2

TRADING
Carbon & Energy
24 | 6

RISK ANALYSIS
Research
15 | 5 | 6

INSURTECH
& Financial Products
10 | 7

REGTECH
Reporting & Accounting
11 | 2 | 2

0 5 10 15 20 25 30 35 40 45 50 55 60

Examples:

- Climate risk analysis firms _Carbon Delta acquired by MSCI_ and _Four Twenty Seven acquired by Moody's_ (2019)
- _Sustainalytics acquired by Morningstar_ for an undisclosed amount (2020)
- _Truvalue Labs acquired by FactSet_ for an undisclosed amount (2020)
- OpenInvest enabling personalisation of investment portfolios - _acquired by JP Morgan Asset Management_ for undisclosed amount, pre-Series B, having raised ~$25m (2021)

Active Investors

	Fund	Contact	Type
1	New Energy Nexus	Aaron McCreary Andrew Chang	Accelerator
2	Sustaintech Xcelerator	[ ]	Accelerator
3	Barclays Rise	Alexandra Gheorghe	Corporate
4	BNP Paribas	Matthieu Soulé	Corporate
5	Citi	Jason Chanell	Corporate
6	Digital Financing Task Force (DFTF)	Achim Steiner	Intergovernmental organization
7	Partnership for Carbon Accounting Financials	[ ]	Intergovernmental organization
8	Principles for Responsible Investment	[ ]	Intergovernmental organization
9	CommerzVentures	Paul Morgenthaler	Investor
10	Core Innovation Capital	David Roos	Investor
11	GTR Ventures	Kelvin Tan	Investor
12	Illuminate Financial	Mark Whitcroft	Investor
13	Octopus Ventures	Natasha Jones	Investor
14	Redsand Ventures	Nicole Anderson	Investor
15	Stripe	Hannah Bebbington	Investor
16	Union Square Ventures	Albert Wenger	Investor

Risks

1. The rules of the game are still being defined for reporting and tracking (TCFD, SASB, emissions trading specs, etc), introducing uncertainty and "a bit of a wait-and-see" dilemma for entrepreneurs. (_Bruno_

Werneck de Almeida)
2. Public policy and incentives need to continuously evolve to mobilise the maximum possible private sector capital towards climate-aligned instruments
3. Over-reliance on carbon offsets, while standards or verification for offset quality are not yet available, increases the risk of green-washing
4. Solutions focused on consumer education and choice can be meaningful as a mechanism for education and engagement, and can increase the pace of change by increasing pressure on institutions. However, they have a lower and less direct impact compared to business solutions and may divert resources from more powerful climate change fighting technologies
5. GHG are not yet fully priced into both the real economy and markets, leading to cheap distribution of non-green assets

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