

CHINA GREEN BOND MARKET REPORT

2021



Climate Bonds INITIATIVE

中债研发中心 CCDC RESEARCH



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Introduction

This report is the sixth iteration of the China Green Bond Market Report, co-produced by the Climate Bonds Initiative (Climate Bonds) with the China Central Depository & Clearing Company (CCDC Research), and with support from HSBC. It describes the shape and size of China's green bond market up to the end of 2021.

2021 was the first year after China announced carbon dioxide peaking by 2030 and carbon neutrality by 2060 (30-60 targets). It was also the starting year of the nation's fourteenth Five-Year Plan period (2021-2025). The country's action to expedite carbon emission reduction was reflected in the vigorous expansion of its green bond market during the year. Cumulative issuance of green bonds by Climate Bonds definition reached nearly USD200bn (RMB1.3tn) at the end of 2021. Annual issuance made a record high to USD68.2 (RMB440.1bn), up 186% from a year earlier.¹ China ranked the second largest green bond market in the world by both accounts.

China's green bond issuance grew the most among major markets in 2021. The surge was mainly spurred by the influx of new issuers, mostly non-financial corporates from the Industrials and Utilities groups. Issuance from non-financial corporates surpassed financial corporates to be the top supply of Chinese green bonds.² Over 60% of overall Use-of-Proceeds (UoP) went to Renewable Energy, reflecting robust investments to transform the nation's energy consumption structure. China aims to increase the share of non-fossil fuel use to about 20% by 2025 from 15.9% in 2020. The International Energy Agency (IEA) projected that the country is likely to reach carbon peaking before 2030 if it meets its short-term energy targets.

Various research shows that the current level of green and low-carbon investment cannot support China's carbon neutrality goal and a much larger scale is needed. We expect the growth momentum seen in the 2021 green bond market to continue, with the support of further reform in green financial policy and surging demand from investors. Further refinement in all mechanisms covering standards, disclosure, incentives, products, and international cooperation will materialise and lay a solid foundation to nurture a scaling market to support ambitious climate goals.

To deliver its net-zero goals, China faces the urgency to fundamentally boost transitions from carbon-intensive industries. New financial products such as transition bonds and sustainability-linked bonds are welcoming examples to support that. As innovations continue to evolve, it is equally crucial to stress the importance of a consistent approach in setting standards. Climate Bonds' Frameworks to Assess Transition, highlighting five Core Principles, lays the groundwork for a transition label that assists decisive investments to finance credible transitions in coming years.

As China further opens up its capital market, international cooperation in green finance also plays a role in facilitating cross-border fund flows. The EU-China Common Ground Taxonomy (CGT) supports the expansion of China's green bond market and makes it easier for Chinese entities to issue green bonds overseas. The implementation of the CGT will be further explored by the market.

Globally, the annual issuance of USD1tn in green bonds is expected to be in sight by the end of 2022. China will certainly be a sizable component of that.

About Climate Bonds Initiative

Climate Bonds Initiative is an international organisation working solely to mobilise the largest capital market of all, the USD100tn bond market, for climate change solutions. The mission is to help drive down the cost of capital for large-scale climate and infrastructure projects and to support governments seeking to increase capital market investment to meet climate goals. The Climate Bonds Initiative carries out market analysis, policy research and market development. It advises governments and regulators and administers a global green bond certification scheme.

Climate Bonds Partners range from investors representing USD14tn of assets under management and the world's leading investment banks to governments such as Switzerland and France. The Climate Bonds Initiative is the lead partner in the Green Infrastructure Investment Coalition. Sean Kidney, Climate Bonds Initiative CEO, is a member of the European Commission's Technical Expert Group on Sustainable Finance.

Green bond market development

Market overview 2021

The world's fastest growing green bond market

China's green bond market rebounded rigorously in 2021. The rapid expansion was underpinned by President Xi Jinping's September 2020 commitment to the twin goals of carbon peaking before 2030 and carbon neutrality by 2060 (30·60 targets).

In 2021, China's labelled green bond market experienced the highest growth rate since the introduction of the green financial policy framework in 2016. Total labelled issuance in the domestic and international markets more than doubled (2.4 times) to USD109.5bn (RMB706.3bn) from a year earlier, representing the most substantial annual increment by both absolute value and by percentage over the prior five years.³ Labelled green bonds accounted for around 1% of China's overall bond market in 2021, indicating vast potential for further growth.

Climate Bonds has recorded USD200bn in cumulative green debt from China

Climate Bonds screens self-labelled debt instruments from over 80 jurisdictions against the Climate Bonds Green Bond Database Methodology (2020 version) (the Methodology) to identify deals eligible for inclusion in the Climate Bonds Green Bond Database (GBDB). Inclusion in Climate Bonds GBDB indicates the bonds' general alignment (aligned green bonds) to the Climate Bonds Taxonomy (Appendix I). This allows cross-market analysis and comparison by applying the same standard and methodology globally.

This report analyses the Climate Bonds GBDB as of 28 February 2022, unless otherwise specified.

We identified USD68.2bn (RMB440.1bn) worth of Chinese green bonds aligned with both Chinese and Climate Bonds green definitions in 2021, bringing cumulative issuance to USD199.2bn (RMB1.3tn). Onshore issuance grew 231% to USD55.5bn (CNY358.5bn), and offshore increased by 80% to USD12.7bn (RMB82.0bn).⁴ Green bonds that were only aligned with China's local definitions of green amounted to USD35.3bn (RMB227.6bn). Another USD6.0bn (RMB38.6bn) worth of labelled green bonds were on the pending list (Appendix II) as at the end of February, awaiting further clarification from issuers.

Chinese green bond issuance rebounded in 2021



Source: Climate Bonds Initiative

Climate Bonds Taxonomy and the Methodology

Climate Bonds screens self-labelled green debt instruments for inclusion in the Climate Bonds GBDB based on the Methodology, which determines general alignment of the instruments to the Climate Bonds Taxonomy.

The Climate Bonds Taxonomy provides broad guidance on eligible sectors and subsectors, as well as metrics and other indicators (Sector Criteria). It is designed to help identify assets, projects, and expenditures needed to deliver a low carbon economy and provides greenhouse gas (GHG) emissions screening criteria consistent with the 1.5-degree global warming target set in the Paris Agreement.

While based on the Climate Bonds Taxonomy and the Sector Criteria, the Methodology uses a modified sector list, and adapts to 1)

allow assessment in the absence of metrics disclosure and/or third-party verification of metrics; and 2) relax the requirements for the more challenging sectors so as not to stifle the green bond market prematurely. For example, the Methodology follows the Taxonomy closely in some sectors where measurement is less of an issue (e.g., solar, wind) or metrics are typically met by certain types of assets (e.g., rail freight excluding fossil fuel freight). For sectors where metrics are not readily available and/or need further assessment against a benchmark, the Methodology uses adapted approaches. For example, the Methodology takes a pragmatic approach to property financing, using information such as building certification schemes and energy efficiency ratings as references.

About 62% of China's labelled green bonds were included in Climate Bonds GBDB in 2021, representing a 10-percentage points improvement in the inclusion rate from 2020. This could be due to the *Green Bond Endorsed Project Catalogue (2021 Edition)*, which came into effect on 1 July 2021. This is widely regarded as the leading green bond taxonomy in China,

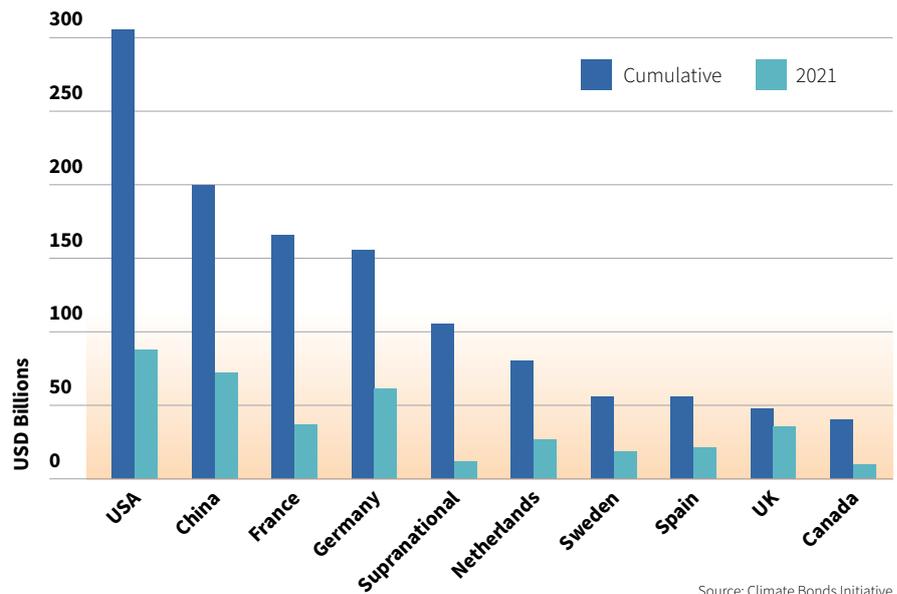
and this version removed carbon-intensive projects related to fossil fuels such as clean coal technology, and adopted the do no significant harm (DNSH) principle, aligning with international standards.

China ranked the second largest green bond market; it topped growth among leading markets

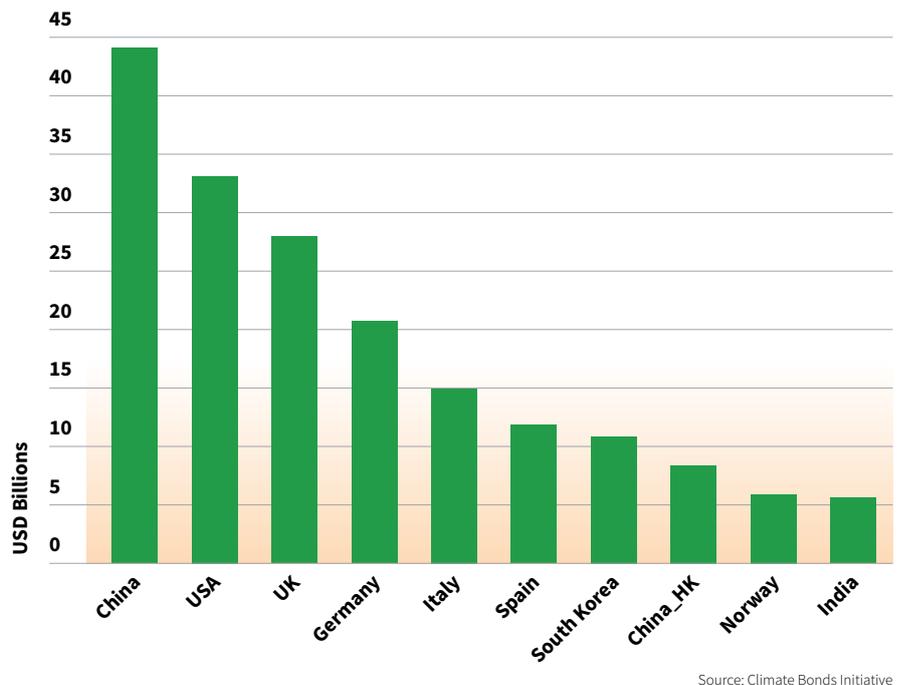
Global green bond issuance surpassed the USD500bn-per-annum milestone (USD513bn) in 2021. The US, China, and Germany were in leading positions, with 2021 green issuance of USD83.5bn, USD68.2bn, and USD63.3bn, respectively. China jumped to second place from its 2020 fourth position. By cumulative volume at the end of 2021, China (USD199.2bn) also came the second next to the US (USD 305.5bn).

China led as the highest growing market in green bond issuance globally. China issued USD44.4bn (RMB286.3bn) more green bonds than a year earlier. The growth is followed by the US, the UK, and Germany, with annual increments of USD33.2bn, USD28.5bn, and USD20.9bn, respectively.

China is the second largest source of green bonds



China's 2021 volume was USD44bn above 2020



Hundreds of trillions are required to achieve China's climate goals

Various institutions have estimated the amount of investment required for China to meet carbon dioxide peaking and carbon neutrality targets. One common conclusion can be drawn from these estimates: the current level of investment falls short of meeting the goals, and a larger scale of investments is needed to reach net-zero.

Organisation	Estimates
IEA	Total annual investment reaches USD640bn (RMB4tn) in 2030 and USD900bn (RMB6tn) in 2060, almost a 60% increase from recent years (energy sector only) ⁵
Institute for Climate Change and Sustainable Development, Tsinghua University	New investment of around USD20tn (RMB138tn) will be needed between 2020 and 2050 (energy system alone) ⁶
The Investment Association of China, Rocky Mountain Institute	An estimate of RMB70tn infrastructure investment is needed to achieve carbon neutrality goal ⁷

Issuer types

Near half of the Chinese Green Bonds were issued by non-financial corporates

In 2021, green bond issuance from non-financial corporates grew 482% to USD31.2bn (RMB201.1bn), accounting for nearly half (46%) of the Chinese green bond volumes. 2021 is the first year in which non-financial corporates was the primary source of supply, overtaking financial corporates. A total of 79 non-financial corporates issued green bonds, more than double the 35 issuers who engaged in 2020.

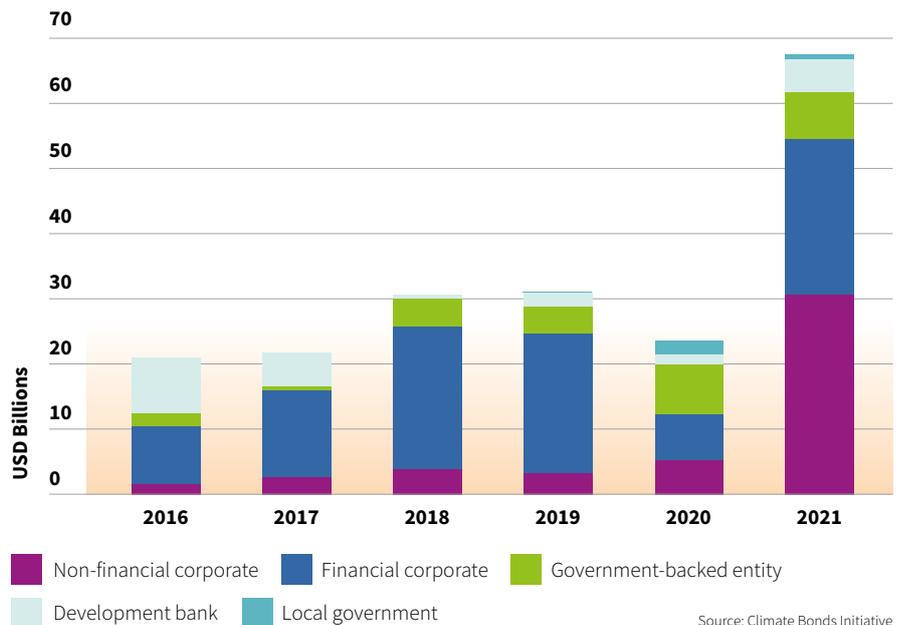
Volumes from financial corporates expanded 237% to USD24.0bn (RMB 155.0bn), contributing 35% to the overall green bond issuance. Government-backed entities, development banks, and local governments accounted for 11%, 8%, and 1%, respectively. China has not issued sovereign green bonds.

Most of the growth in green bond volumes (USD44.4bn) came from non-financial and financial corporates. Non-financial corporate issuance increased by USD25.8bn (RMB166.5bn) from a year earlier, accounting for 58% of the total growth; financial corporate issuance grew USD16.9bn (RMB109.0bn), making up 38%; net increment from other issuer types attributed 4%.

Issuer base substantially broadened in 2021

2021 saw a larger number of issuers in the green bond market, contributing to increased diversification of supply. The 2021 pool of green

Financial and non-financial corporates drove market growth in 2021

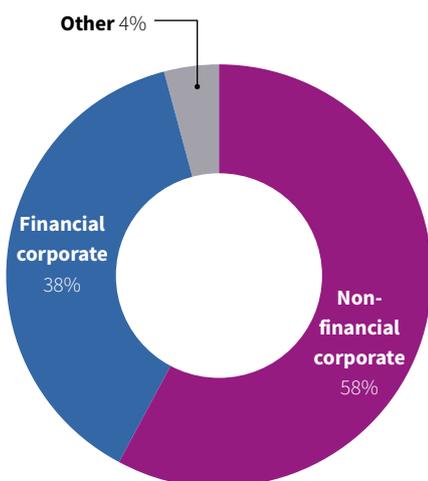


bonds came from 138 issuers, 94 of whom were debut issuers. These issuers either had not previously participated in the green bond market; while others issued green bonds which qualified for inclusion in the Climate Bonds GBDB having previously issued labelled green bonds aligned with the Chinese green standard.

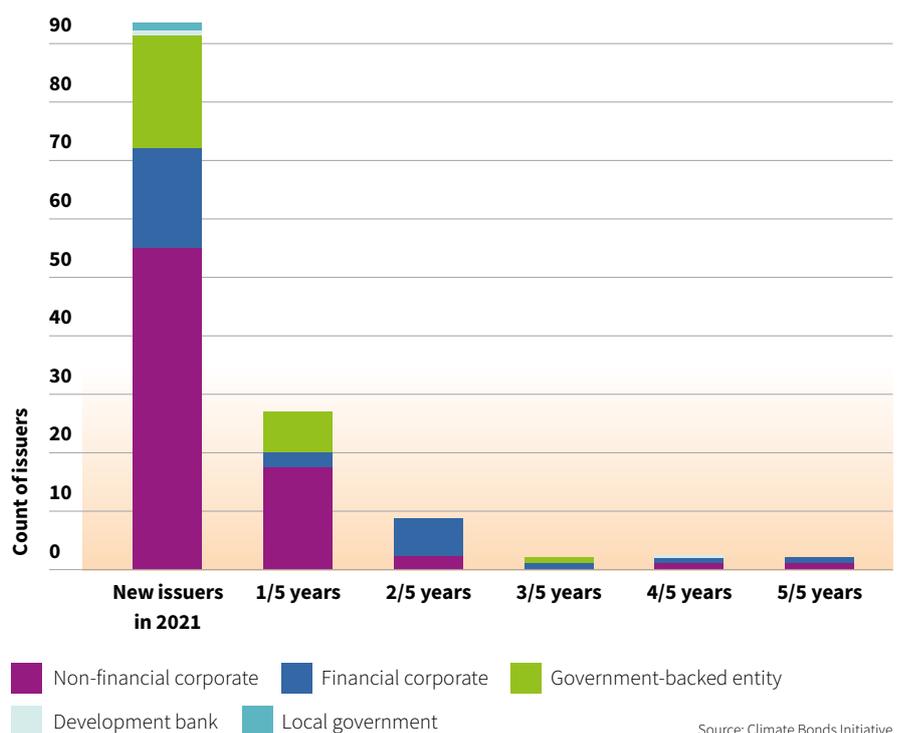
Almost 60% of these debut issuers were non-financial corporates, 18% were financial

corporates, and 21% were government-backed entities by Climate Bonds defined issuer types. 26 issuers had participated in one of the prior five years (2016-2020), and the remaining 18 were more frequent issuers (issued in at least 2/5 years). Active issuers who came to the green bond market every year from 2016 to 2021 included the **Bank of China, Wuhan Metro Group, and Modern Land.**

2021 growth came from financial and non-financial corporates



Debut green bond issuers accounted for 68% of the 2021 total



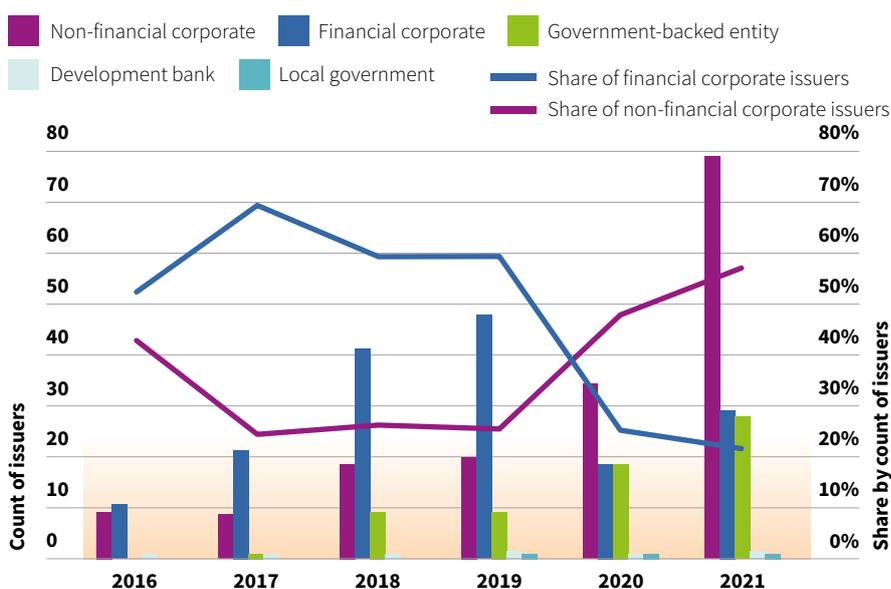
Historically, financial corporates were the primary source of Chinese green bonds. They accounted for 52-70% of issuers from 2016 to 2019. The number of non-financial corporate issuers started to surpass that of financial corporates in 2020. However, because their average deal sizes were much smaller than those of their financial counterparts, the volumes from non-financial corporates remained relatively smaller until 2021. Non-financial corporates issued USD7.1bn (RMB46.1bn) more green bond volumes compared to financial corporates in 2021.

Issuance is dominated by State-owned enterprises (SOEs)

SOE issuance accounted for 97% of onshore green bonds by the number of deals and nearly 99% by volume in 2021.⁸ SOEs fulfil a critical role in financing infrastructure construction in China. For example, compared with most major economies, China's SOEs have a relatively higher share of ownership in power generation capacity.⁹ SOEs are also expected to 'scale up green and low-carbon investment and work actively to research, develop, and practically apply low-carbon, zero-carbon, and carbon-negative technologies', as stated in the *Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy*.¹⁰ The largest three green bonds issued by SOEs were all from the **China Development Bank**.

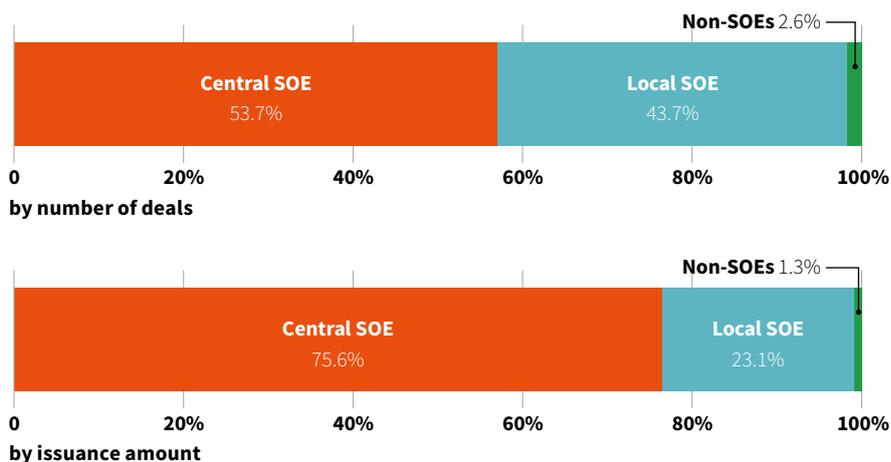
Participation from non-SOEs or private sector entities are yet to pick up. In the vanilla Chinese onshore bond market, private participation has been shrinking, accounting for only 5% of corporate and enterprise bonds in 2020, the lowest since 2016.¹¹ Examples of private companies that issued an onshore green bond in 2021 included **Jiangsu Shenghong Technology** and **Shanying International Holdings**.

The number of non-financial corporate issuers more than doubled in 2021



Source: Climate Bonds Initiative

State-owned enterprises dominated onshore green bond issuance in 2021



Source: Wind; Climate Bonds Initiative

Climate Bonds' issuer type categories

Climate Bonds categorises issuer types under six buckets globally: non-financial corporate, financial corporate, government-backed entity, development bank, local government, and sovereign. This grouping provides a broad sense of issuer's background and does not reflect Chinese issuers' public or private nature. For example, non-financial and financial corporates either private or State-owned enterprises (SOEs). Those flagged as Urban Investment Bonds (UIBs) issued by local government financing vehicles (LGFVs) are put under the government-backed entity bucket in the Climate Bonds GBDB, but officially governments do not provide repayment support.

China's climate goal and green financial policy

The 2016 publication of the *Guidelines for Establishing the Green Financial System* marked the official start of China's green finance market, endorsing activities supporting environmental improvement, climate change mitigation and more efficient resource utilisation.¹² This approach has led to tremendous growth in green



financial products (including green bonds) underpinned by a continuous revision of green financial policies.

President Xi Jinping's announcement of China's 30·60 targets at the United Nations General Assembly in September 2020 marked another pivotal milestone in stating the country's ambition to transition to a low-carbon and zero-carbon economy. How China strikes a balance

between carbon emission reduction with the overall economic and social development transformation will have fundamental implications for its green financial policy and market development in years to come. Below tracks China's key progress made in 2021 on green finance-related policies, from top-level framework guidance to regulatory directives on standards, disclosure, incentives, and restraint, to international cooperation.

Top-level policy progress

"1+N" Policy Framework

"1" refers to long-term approach to combating climate change (the *Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy*) (24 October 2021)

"N" refers to solutions to achieve peak carbon emissions by 2030 (the *Action Plan for Carbon Dioxide Peaking Before 2030*) (24 October 2021)

Five-pillar structure

Key updates in green financial directives

1. Green financial standard system

- PBoC, NDRC, CSRC: *Green Bond Endorsed Project Catalogue* (2021 Edition) (effective 1 July 2021)
- PBoC: *Environmental Equity Financing Tool* (22 July 2021)

2. Disclosure requirements and financial institution supervision

- PBoC: *Guidelines on Environmental Disclosure for Financial Institutions* (22 July 2021)
- MEE: *Plan for the Reform of the Legal Disclosure System of Environmental Information* --> *New Disclosure Rules* (24 May 2021)

3. Incentive and restraint mechanism

- PBoC: *Green Financial Evaluation Programme for Banking Financial Institutions* (effective 1 July 2021)
- PBoC: monetary policy tool to support carbon emission reduction projects (8 November 2021)

4. Green financial products and market system

- NAFMII: *Clarifying Mechanisms in Relation to Carbon Neutrality Bonds* (18 March 2022)
- NAFMII: *Pilot Programme for Overseas Issuers to Issue Social Bonds and Sustainability Bonds in China* (11 November 2021)
- NAFMII: *the Ten Questions and Ten Answers on SLB* (28 April, 2021)

5. International cooperation in Green finance

- IPSF: the first *EU-China Common Ground Taxonomy (CGT) Instruction Report* (consultation from 4 November 2021 until 14 January 2022)
- G20: China and the U.S co-charing Sustainable Finance Study Group (SFSG) (26 February 2021)

Acronyms of institutions used in table:
PBOC People's Bank of China; NDRC The National Development and Reform Commission; CSRC The China Securities Regulatory Commission; MEE Ministry of Ecology and Environment; NAFMII The National Association of Financial Market Institutional Investors; IPSF International Platform on Sustainable Finance.

Onshore vs. offshore

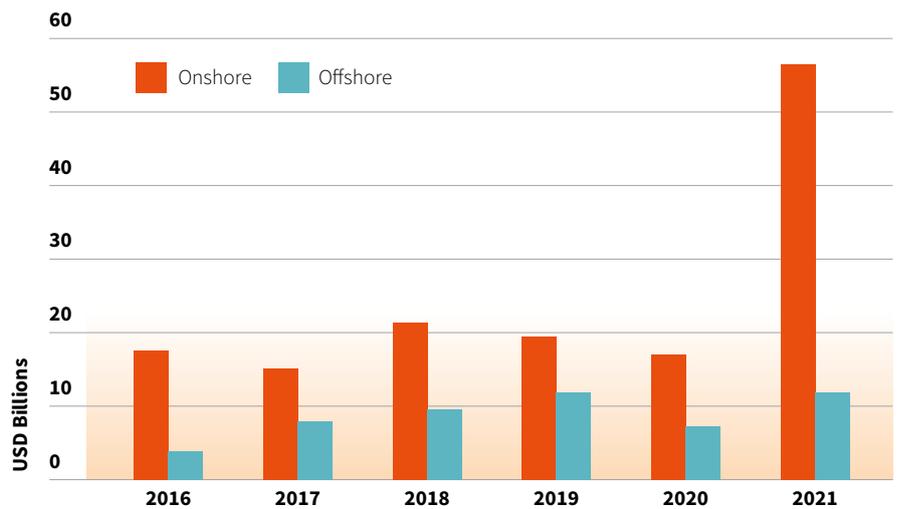
The onshore market grew 2.3 times year-on-year

In 2021, 122 issuers participated in the onshore green bond market, driving issuance up 231% to USD55.5bn (RMB358.0bn). The onshore market constituted 81.4% of 2021 green bond issuance originating from China and 87% of the growth. **Industrial and Commercial Bank of China (ICBC)** was the only issuer that participated in both onshore and offshore green bond markets in 2021.

Issuance from the utilities, financials and industrials sectors (as per WIND industry classifications) were responsible for 96% of onshore green bond issuance. Even though transactions from the financials issuers constituted 15% by count of deals number, they were responsible for 33.5% of the proceeds, as the average deal size from the financial sector was larger than other industry groups.

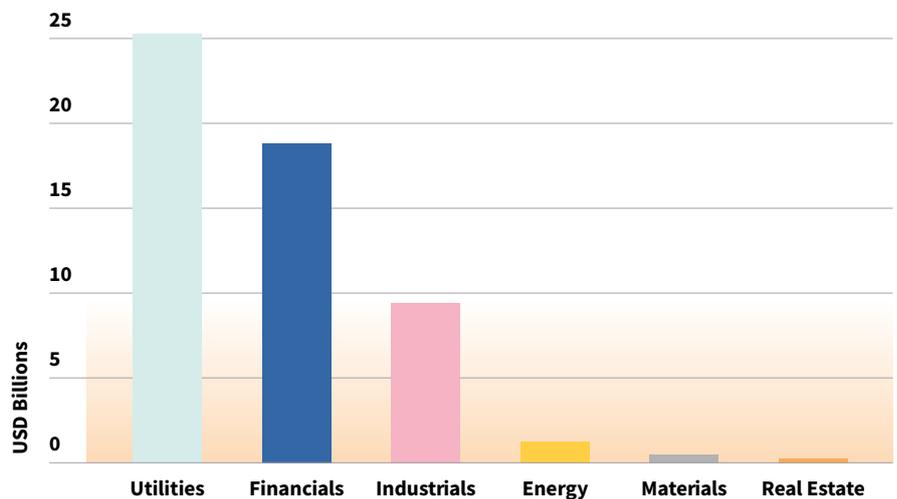
The largest number of debut green bond issuers came from the industrial sector. Examples of new issuers (or returning issuers whose green bonds were first included in the Climate Bonds GBDB in 2021) included **Shenzhen Metro Group**, **Kunming Rail Transit Group**, and **Capital Airports Holding Company**. The utilities sector also saw a large influx of new participants in the green bond market in 2021. Examples included **Huaneng Power International**, **Fujian Huadian Furui Energy Development**.

The onshore market provided most of the 2021 growth



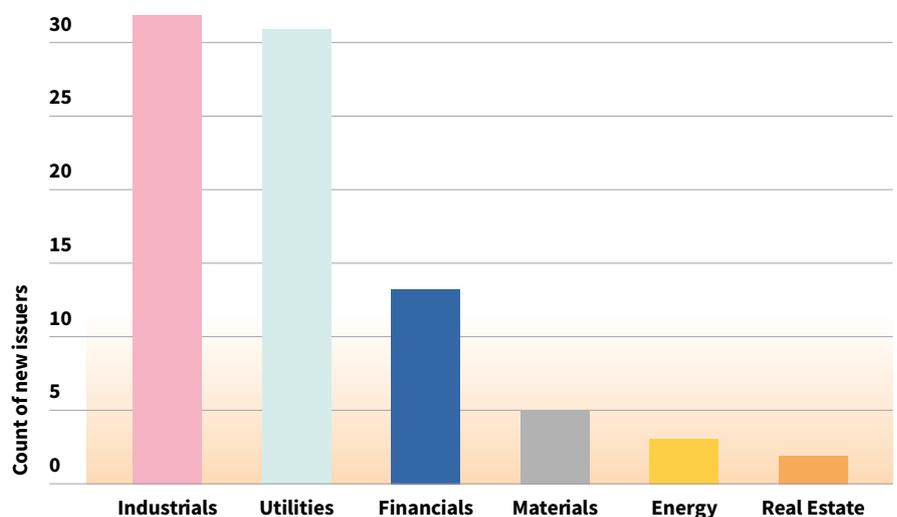
Source: Climate Bonds Initiative

Onshore green bond issuance was led by the utility, financial, and industrial sectors



Source: Wind; Climate Bonds Initiative

Most debut issuers in onshore green bond market came from industrial and utility sectors



Source: Wind; Climate Bonds Initiative

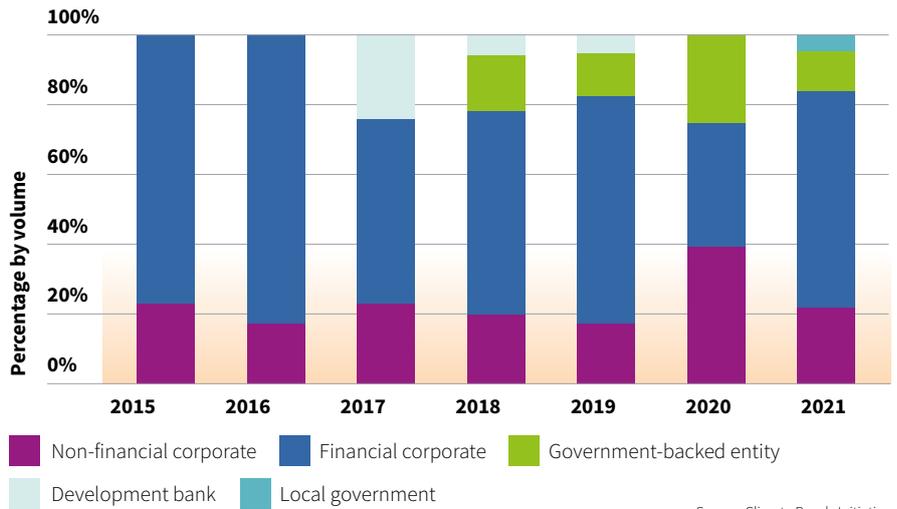
Financial corporate was the primary issuer type in the offshore market

Offshore green bond issuance grew 80% year-on-year (YOY) to USD12.7bn (RMB 82.0bn). It accounted for 18.6% of the 2021 total green bond volumes from Chinese issuers. Unlike in the onshore green bond market, deals from financial corporates remained dominant in the offshore market, making up 62% the category.

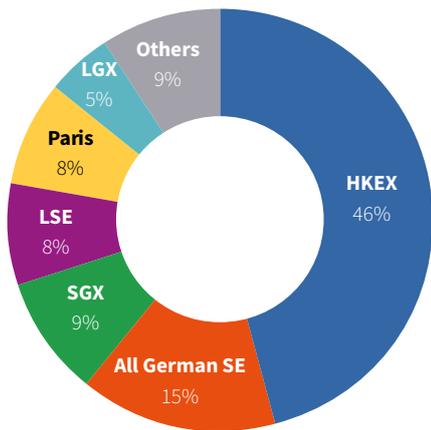
Local governments started to issue off-shore green bonds in 2021. The **Municipality of Shenzhen China** pioneered by issuing a dual tranche RMB-denominated green deal in Hong Kong in October. The proceeds were earmarked for Clean Transportation, Water Treatment, and sponge city-related projects under the city's framework of green finance.

Most (71% by volume) of the offshore green bonds were denominated in USD, followed by EUR and CNH (offshore renminbi). Hong Kong Exchange (HKEX) remained the largest listing venue for Chinese offshore green bonds, taking up 46% of the offshore volume in 2021.

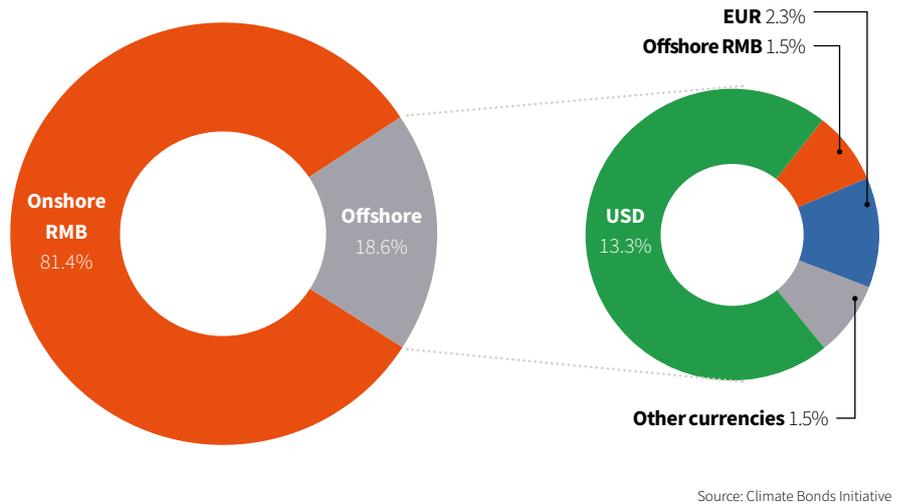
Financial corporates dominated offshore issuance



Listing venues of Chinese offshore green bonds in 2021



Currency split of Chinese green bonds in 2021



Use of Proceeds

Most proceeds went into Energy, Transport, and Buildings

Most (88.3%) of the Use of Proceeds (UoP) of Chinese green bonds issued in 2021 was earmarked for Renewable Energy, Low Carbon Transport, and Low Carbon Building.

Renewable Energy was the largest Chinese UoP category in 2021, at 60.6%. The category grew by 3.6 times to USD41.3bn (RMB266.4bn) compared to USD9.0bn (RMB58.1bn) a year ago. Top deals were issued by the **China Development Bank**, **State Grid Corporation of China**, and **State Power Investment Corporation Limited**.

Low Carbon Transport also enjoyed huge expansion. It grew 78% YOY to USD12.8bn (RMB82.6bn), accounting for 18.8% of the volumes. Buildings grew 83% to USD6.1bn (RMB39.3bn), or about 8.9% of overall Chinese green bond issuance. No proceeds were earmarked for the Industry or ICT UoP categories in 2021.

Sectors and Use of Proceeds

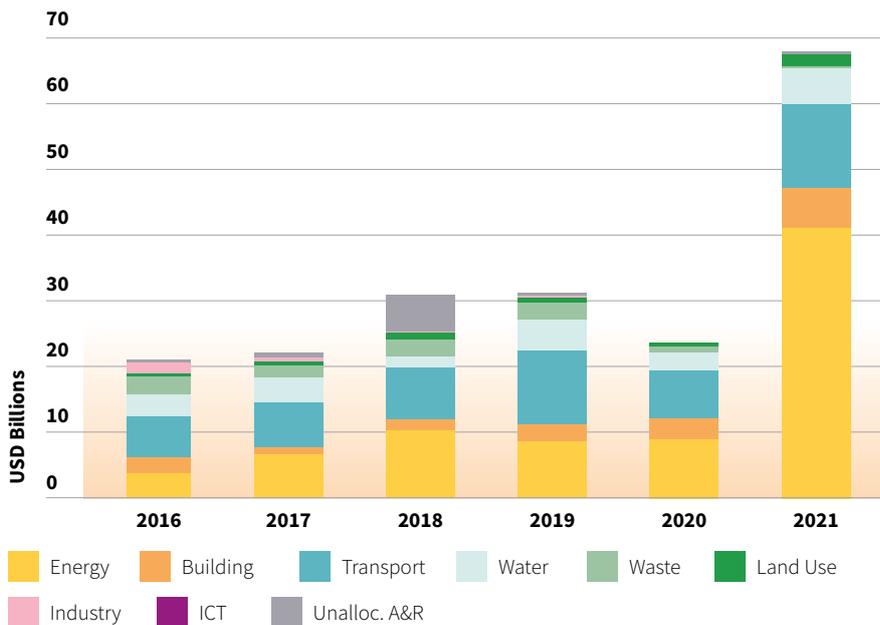
The sector of a bond describes the economic activity of its issuer. The Global Industry Classification Standard (GICS) and WIND industry classification are examples of sector classification standards. The UoP category describes how the funds raised from the sale of the instrument will be deployed. Taxonomies provided by organisations such as Climate Bonds, the EU, and China are examples of UoP categorisations. The sector of a bond issuer is unrelated to the UoP categories. For example, a supermarket chain can issue a green bond with Energy Efficiency as UoP. The proceeds can be used to either green the activity or operating environment of the issuing entity, or on developing areas of its business that will contribute to the goals of the Paris Agreement.

Renewable Energy led growth among UoP categories

Renewable Energy grew USD32.3bn (RMB208.5bn), contributing 73% to Chinese green bond growth in 2021. This marked increase in financing of Renewable Energy projects and assets and was underpinned by the country's commitment to reaching its 30:60 targets.

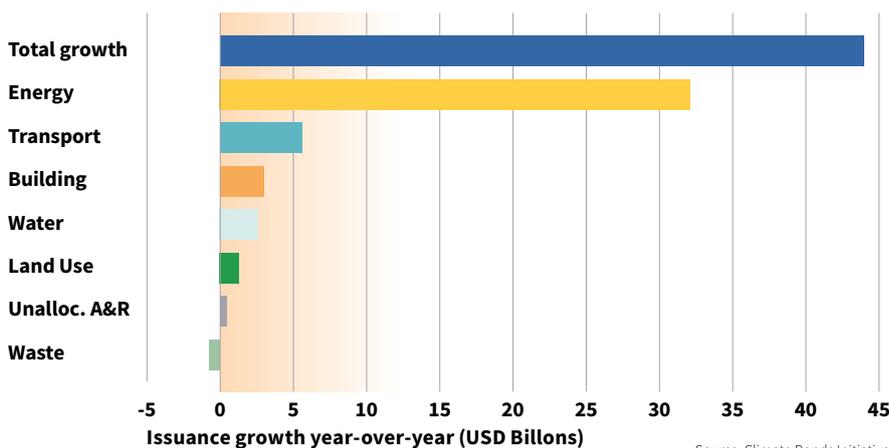
Utilities and financial issuers were the main sources of Renewable Energy UoP in the onshore market. Proceeds raised by utilities for Renewable Energy projects and assets amounted to USD24.2bn (RMB156.4bn), representing almost all (96%) of the UoP from onshore green utility bonds. Most (58%) of the UoP from financial issuers was also earmarked for Renewable Energy. Overall, 69% of onshore green bond UoP and 25% of offshore went into the Renewable Energy.

UoP profile of overall Chinese green bond market (Climate Bonds definition)



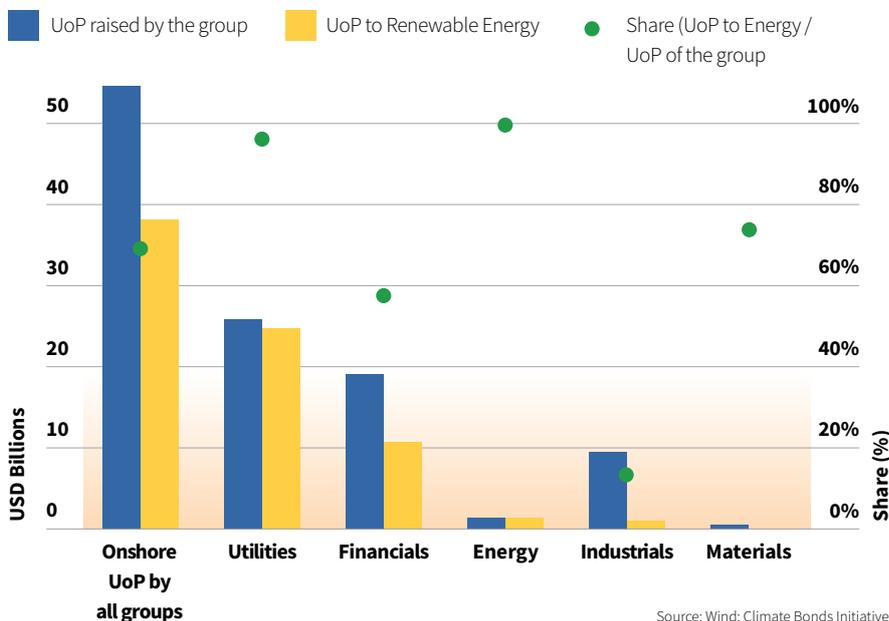
Source: Climate Bonds Initiative

Renewable Energy was the largest source of 2021 growth



Source: Climate Bonds Initiative

Renewable Energy received most of the utility and financial sectors' UoP



Source: Wind; Climate Bonds Initiative

The offshore green bond market was more evenly distributed across UoP categories. Renewable Energy, Low-carbon Building, Low-carbon Transport, and Water absorbed a combined 91% share of the international UoP.

Top offshore issuers by UoP categories

Energy (25.1%)*

ICBC
Industrial Bank
Bank of China

Building (22.5%)

Yuzhou Group Holdings
Bank of China
CIFI Holdings

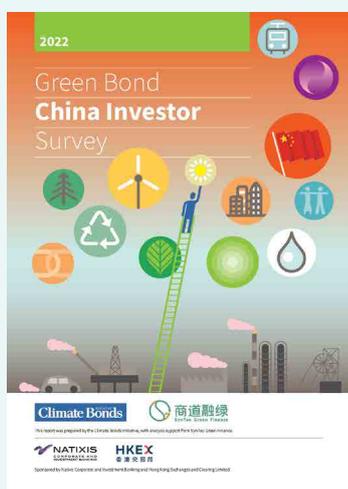
Transport (20.8%)

ICBC
Bank of China
China Construction Bank

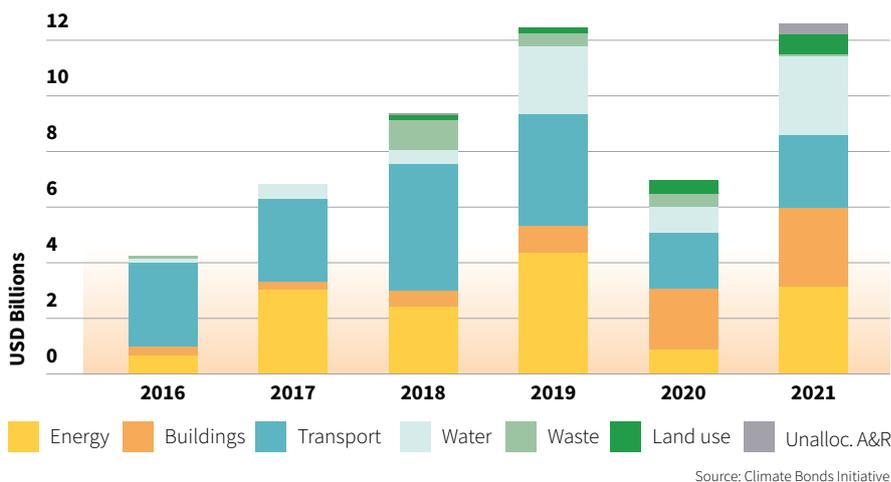
*Share (UoP in this category/Total offshore issuance)

Survey suggested investor interest in Energy and Transport

Climate Bonds *China Green Bond Investor Survey 2022* reported on the results of a survey of 42 investment institutions across the Chinese on-shore and off-shore markets. Both local and international respondents highlighted Renewable Energy and Low Carbon Transport as the largest UoP categories among their current investments. They were also indicated as the top two categories from which respondents would like to buy more green bonds.¹³



UoP profile of Chinese offshore green bond market (GBDB)



IEA: China's carbon dioxide emission peaking before 2030 in sight

According to the IEA, if China achieves its short-term energy targets as outlined in its 14th Five-year Plan (FYP), the country will be on track to reach carbon peaking in the mid-2020s. Achieving this depends on progress in three key areas: energy efficiency, renewables, and reducing coal use.¹⁴ This implies that a major transformation in China's energy consumption mix plays a pivotal role in reaching its climate goals.

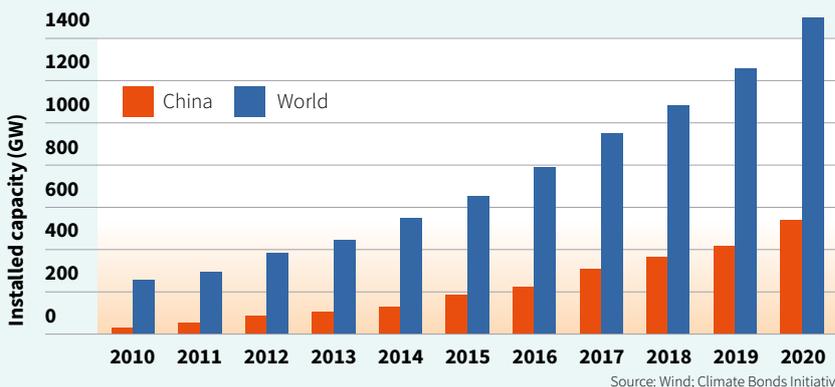
IEA also stated that renewables-based generation would need to increase seven-fold by 2060 from the 2020 level for China's power sector to reach net-zero carbon dioxide emission. This points at the huge investment needed to make it happen in the renewable space. China had an installed capacity of 535GW from wind and solar PV as of 2020, accounting for about 1/3 of the world's total capacity.

China's record in meeting its set energy-related targets in past FYPs is listed below.

Energy- & Environment-related KPIs	12th FYP (2011-2015, vs 2010)		13th FYP (2016-2020, vs 2015)		14th FYP (2021-2025, vs 2020)
	Target	Achievement	Target	Achievement	Target
Reduction in energy consumption per unit of GDP	16%	18.2%	15%	13.2%	13.5%
Non-fossil fuel percentage	11.4%	12.0%	15.0%	15.9%	20.0%
Carbon emission reduction per unit of GDP	17%	20%	18%	18.8%	17.6%

Source: NDRC, NEA, State Council. Compiled by Climate Bonds Initiative

China accounted for 1/3 of world's installed capacity from wind and solar PV in 2020



External reviews

SPO remained the most popular external review type

The majority of issuance (78% by issuance volume) obtained an external review, which provides an independent confirmation of the alignment of the green bond with a specific green bond framework or standards, i.e., credibility of greenness (Appendix III).

The second-party opinion (SPO) remained the most popular external review type in both onshore (50% by volume) and offshore (33% by volume) markets, both by deal count and volume. Assurance is more prevalent in the offshore market, while it had lower penetration onshore.

The volume of Certified Climate Bonds grew nearly four times (3.7) to USD16.9bn (RMB108.8bn), covering 15 deals (five onshore and 10 offshore). These Certified Climate Bonds had an average deal size larger than those obtaining either assurance or SPO, and those without external review.

The Climate Bonds Standard and Certification Scheme

The Climate Bonds Standard and Certification Scheme is a labelling scheme for bonds, loans & other debt instruments.



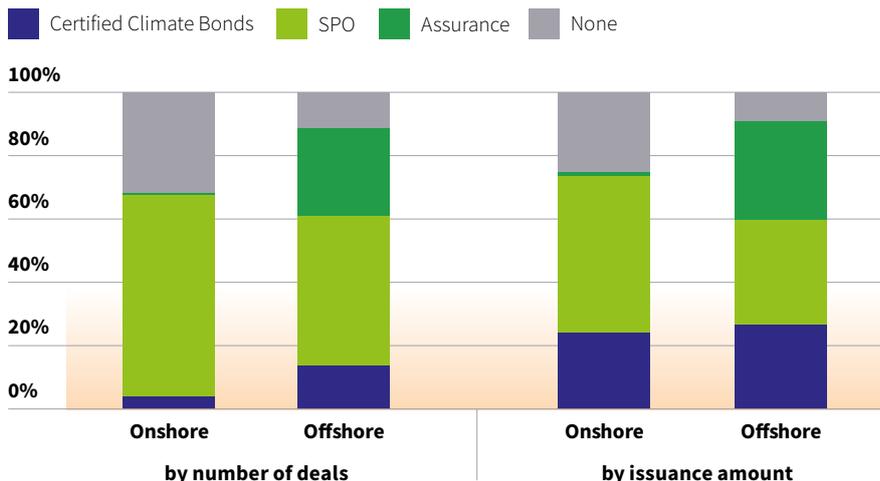
Rigorous scientific criteria ensure that it is consistent with the goals of the Paris Climate Agreement to limit warming to under 1.5oC. The Scheme is used globally by bond issuers, governments, investors and the financial markets to prioritise investments which genuinely contribute to addressing climate change.

Tenor & Maturity

Most Chinese green bonds have tenor of three years

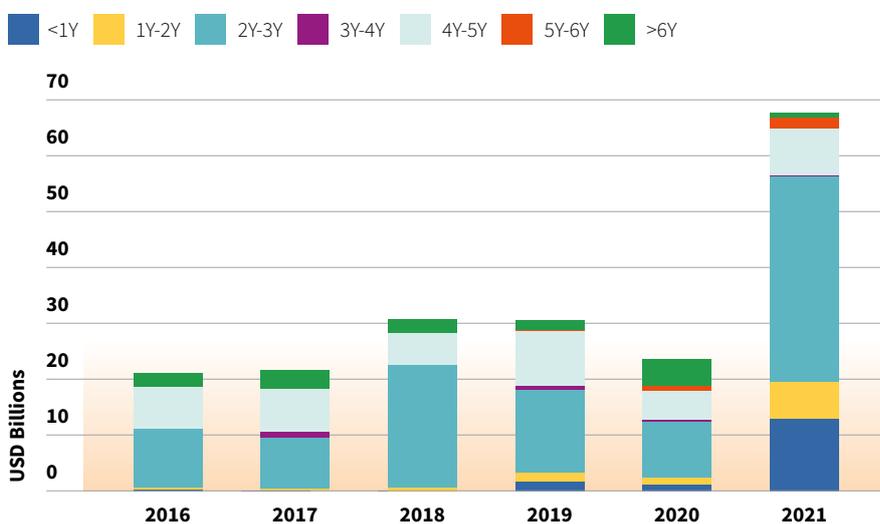
The 3-year tenor remained the most popular in 2021. This bucket accounted for a little over half (54%) of the overall issuance volume in the Chinese green bond market in 2021. Short-term deals (one year or less) grew almost ten times from the prior year to USD13.1bn (RMB84.4bn), accounting for 19% of the overall issuance in Chinese green bond market. Previously, this bracket constituted a maximum of 6% of annual issuance from 2016-2020. Most of the deals in 2021 were short-term bonds issued by non-financial corporates.

SPO is the most popular external review type in all markets



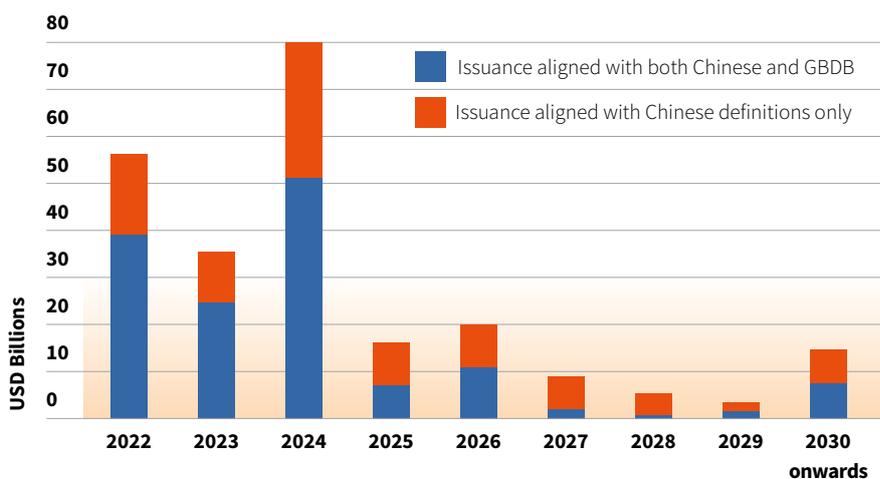
Source: Climate Bonds Initiative

Most Chinese green bonds do not exceed a 3-year tenor



Source: Climate Bonds Initiative

Maturity profile of China's green bonds



Source: Climate Bonds Initiative

90% of green bonds will reach maturity in the next 5 years

By the end of 2021, the total outstanding amount of China's overall labelled green bonds stood at USD239.5bn (RMB1.5tn). The outstanding amount of issuance aligned with both Chinese

and Climate Bonds green definitions was USD145.3bn (RMB937.8bn); about 92% of these bonds will mature by 2026 and 84% by 2024, reflecting their medium- and short-term nature. This implies a huge potential for new issuance in several years' time.

Themes and innovations

In 2021, China's debt market benefitted from further innovation to mobilise funds towards green and sustainable activities and entities that contribute to the transition to carbon neutrality. Standards and taxonomies are also being developed to enable the inclusion of high-emitting sectors in the transition.

Carbon neutrality bonds

A carbon neutrality bond (CNB) is an innovative label, launched by the NAFMII, a self-regulated organisation overseen by the PBOC, in March 2021. Compared with other green bonds in China, the UoP of CNBs is more precisely targeted towards carbon reduction and requires carbon reduction disclosure under dedicated guidelines. CNBs accounted for over 40% of the total labelled green bonds issued in China in 2021.¹⁵ Based on analysis from Climate Bonds, CNBs had closer alignment with Climate Bonds green definition than general labelled Chinese green bonds.

Social and sustainability panda bonds

In November 2021, NAFMII launched a pilot programme to allow overseas issuers to issue social and sustainability bonds in China (panda bonds). Foreign governmental agencies, international development institutions, and overseas non-financial enterprises are eligible issuers.

All proceeds should be exclusively used for the designated social or sustainability projects specified in the framework or issuance documents. Meanwhile, either the Chinese green taxonomy *Green Bond Endorsed Projects Catalogue* or an international taxonomy such as the *EU Taxonomy* can be used to identify green projects.

Far East Horizon, a financial leasing company headquartered in Hong Kong, issued the first sustainability bond in China in November 2021.¹⁶ Its UoP were earmarked for water treatment, smart transport, renewable energy vehicle purchase, and senior care projects.

Transition finance

There is urgent need for the global low-carbon transition to include sectors with high carbon emissions such as steel, cement, petrochemicals, and aviation. Countries are gradually recognising the need to leverage private capital to support the rapid transformation of the industrial sector along a viable decarbonisation pathway.

The transition finance space is developing. It facilitates investment in economic activities and entities that do not fit the scope of support provided by green finance but are essential to reaching the goals of the Paris Agreement. While widely accepted definitions have yet

	Carbon Neutral Bond (CNB)	Other labelled green bonds in China
Eligible UoP CNBs have more focused UoP areas targeted at carbon reduction	All proceeds used for below areas, including but not limited to: <ol style="list-style-type: none"> 1. Clean energy projects 2. Clean transportation projects 3. Sustainable building project 4. Low-carbon transformation projects 5. Other projects with carbon emission reduction benefits 	Green Bond Endorsed Project Catalogue (2021 Edition): <ol style="list-style-type: none"> 1. Energy-saving and environmental protection industry 2. Clean production industry 3. Clean energy industry 4. Eco-environment industry 5. Green upgrading of infrastructure 6. Green services <p>Green Bond Guidelines (2015) by NDRC: allow maximum 50% of proceeds used to repay bank loans and replenish working capital.</p> <p>Exchange-listed guidelines on corporate green bonds: No less than 70% of proceeds used for green projects.</p> <p>Green bond proceeds raised at the China interbank bond market must be used for green purposes (except enterprise bonds).</p>
Information disclosure CNBs have specific guidelines on carbon reduction disclosure	<ul style="list-style-type: none"> • mandatory to disclose actual or expected carbon emission reduction and methodology • encouraged to disclose carbon reduction plan, pathway to reach carbon neutrality and governance mechanism 	broader environmental disclosure such as major pollution liability and environment-related issues or incidents

to materialise, new debt instruments such as transition bonds and sustainability-linked bonds (SLBs) have been introduced to fund such projects and entities.

In the context of China reaching its 30-60 targets, funding support in the hundreds of trillions is needed to support low-carbon transformation for the energy, industrial, construction and transportation sectors. The lack of credible transition financial frameworks, standards and widely accepted instruments remain a major challenge for access to climate finance in high-emitting sectors.

In 2021, Chinese regulatory authorities and market participants have been active in developing transition finance frameworks, standards, and products. The Chinese government has established a central leading group for carbon neutrality work, to coordinate the work of various ministries, commissions, and units. The leading group is formulating a timetable and roadmap for the 30-60 targets, under the guidance of the "1+N" Framework,

covering 10 areas such as green finance, manufacturing, transportation, and low-carbon technology. The PBOC is also taking the lead in forming green and transition finance standards.

In April 2021, NAFMII launched its SLB regulation to broaden new financing channels for sustainable development. *Ten Questions and Ten Answers for SLBs* was compiled based on the international Sustainable Development Linked Bond Principles, and additional issuance requirements appropriate to the domestic market have been proposed.¹⁷

In January 2021, the Bank of China (BOC) issued its first transition bond in the offshore market, the first globally to follow the International Capital Market Association (ICMA)'s Climate Transition Finance Handbook and refer to the industry classification enlisted in the EU Taxonomy. BOC published its Transition Bond Management Statement in early 2021 to facilitate the issuance. The funds raised were earmarked for natural gas co-generation projects, natural gas power generation, and cement plant waste

heat recovery projects.¹⁸ In April, the China Construction Bank (CCB) Singapore also issued a transition bond to fund selected projects, covering industries such as electricity, gas, steam, manufacturing, and steel.¹⁹ Later, **China Huaneng, Datang International Power, Yangtze Power, GD Power Development, Shaanxi Coal and Chemical Group, Liuzhou Steel Group, and Hongshi Group** issued China's first batch of SLBs.

In September 2020, Climate Bonds published a White Paper entitled [Financing Credible Transitions](#), which provides an initial framework and five principles for identifying credible transition finance activities.²⁰ In the discussion paper titled [Transition Finance for Transforming Companies](#), Climate Bonds further suggested five hallmarks of a credibly transitioning company.²¹ To further the development of a consensus on transition finance in China and internationally, Climate Bonds published [Transition Finance in China](#) to review the basic definition and research progress on transition finance, as well as discuss the key opportunities and challenges in developing transition finance in China.²²

Currently, Climate Bonds is coordinating the drafting of rigorous science-based standards to support high-carbon industries and hard-to-abate sectors in setting credible emission reduction pathways and thresholds. Ongoing work includes the development of sector criteria for steel, cement, and basic chemicals. They are expected to be completed in 2022. Climate Bonds also plan to develop criteria for aluminium smelting, hydrogen, mining, oil and gas, and aviation.

Climate Bonds is committed to mobilise funding towards decarbonising areas through promoting specific financial product labels. The development of a transition finance framework and standards will be a continuation of this work.

Five Hallmarks of a Credibly Transitioning Company



1. Paris-aligned targets

- Select sector-specific transition pathway aligned with Paris Agreement goals
- Company-specific KPIs that align as early as possible with that pathway
- Science based, address scope 1, 2 & 3 emissions and address short, medium and long term



2. Robust Plans

- Set the strategy and plan to deliver on those KPIs
- Prepare associated financing plan detailed cost estimates and expected sources of funding
- Put in place necessary governance frameworks to enact change



3. Implementation action

- Capital expenditure, operating expenditure
- Other actions detailed in the strategy



4. Internal reporting

- Track performance
- Re-evaluate and recalibrate KPIs as needed



5. External reporting

- a.** External reporting and independent verification on the KPIs and strategy to deliver (per Hallmarks 1 and 2)
- b.** Annual reporting of independently verified progress in terms of action taken and performance against targets (per Hallmarks 3 and 4)

Outlook

2021 was the first year after China announced its 30-60 targets and the first year of the 14th FYP period. The country's action to expedite carbon emission reduction can be reflected in the development of its green policy system, scaling up of the green bond market, and innovation in related financial products, as seen this year.

China is very likely to reach its carbon peaking goal before 2030. The momentum seen in 2021 will continue to support that. More so, green and sustainable financing in China needs to further accelerate at a larger scale to provide the funding required to reach the 30-60 targets. Implementation will be underpinned by continuous efforts to improve the financial policy framework that supports orderly, credible development in the market.

Chinese financial regulators will further refine their green financial policy under the "1+N" Policy Framework to stimulate market growth, attracting more social and international capital to support the movement. This will be done through all five pillars, covering standards, disclosure, incentives, products, and international cooperation.

The Green Bond Endorsed Project Catalogue update in 2021 was an essential step in narrowing the gap between local and international standards. Removing clean coal projects from the list reflects the change in approach to standard-setting by incorporating the DNSH concept. It also mirrors better alignment with the carbon neutrality goal. Even though clean coal projects prevent air pollution, it perpetuates the use of fossil fuel and the resulting carbon emissions. This concept can be further proliferated to update standards guiding other green financial products such as green loans.

Reforms in information disclosure will be ongoing to form a compulsory disclosure system of environmental information by 2025. Improved disclosure will pave the way to support collecting data and information needed for financial institutions to assess their exposure to environmental and climate risks. Details on environmental disclosure formatting are expected in 2022.²³

Incentivising measures such as monetary tools to support carbon emission reduction projects and green financial evaluation on banking institutions are signals and actions to enhance the role financial intermediaries play in facilitating and mobilising funds towards low-carbon projects and entities in the real economy. Greening the financial system is a crucial step in achieving overall climate goals.

The scale of CNBs may further expand. 2021 saw a proliferation of this label, which accounted for over 40% of labelled Chinese green bonds. It supports low-carbon and emission reduction projects such as clean energy, clean transport, sustainable buildings, and low-carbon renovation of industrial projects. CNBs must also abide by specific carbon reduction disclosure guidelines, which enhance their transparency on related measures.

The 30-60 targets cannot be fulfilled solely through green finance; funding for transitional economic activities, such as clean energy transition of high emitters and energy-saving projects of old buildings is also required. Clear regulatory guidelines, standards, and innovative products are essential elements in nurturing growth and instilling market confidence in transition finance. Despite the lack of a universally accepted standard in transition finance, newly developed instruments (such as transition bonds and SLBs) are sturdy examples of supporting more sectors in transitioning towards low-carbon economy.

As China further opens its capital market, international cooperation in green finance also plays a role in facilitating cross-border fund flows. The EU-China Common Ground Taxonomy (CGT) supports the expansion of China's green bond market and makes it easier for Chinese entities to issue green bonds overseas. The CGT will expand its sector coverage and include more jurisdictions over time. The CGT will extend existing taxonomies to include transition guidance to help scale up financial flows for global low-carbon transition.²⁴ Implementation of the CGT Taxonomy will be further explored by the market.

Appendix I. Taxonomy

Climate Bonds Taxonomy

The Climate Bonds Taxonomy identifies the assets and projects needed to deliver a low carbon economy and gives GHG emissions screening criteria consistent with the 1.5°C global warming limit set by the COP 21 Paris Agreement. More information is available at <https://www.climatebonds.net/standard/taxonomy>.



ENERGY	TRANSPORT	WATER	BUILDINGS	LAND USE & MARINE RESOURCES	INDUSTRY	WASTE	ICT
Solar	Private transport	Water monitoring	Residential	Agriculture	Cement production	Preparation	Broadband networks
Wind	Public passenger transport	Water storage	Commercial	Commercial Forestry	Steel production	Reuse	Telecommuting software and service
Geothermal	Freight rail	Water treatment	Products & systems for efficiency	Ecosystem conservation & restoration	Glass production	Recycling	Data hubs
Bioenergy	Aviation	Water distribution	Urban development	Fisheries & aquaculture	Basic Chemical production	Biological treatment	Power management
Hydropower	Water-borne	Flood defence		Supply chain management	Fuel production	Waste to energy	
Marine Renewables		Nature-based solutions				Landfill	
Electrical Grids & Storage						Radioactive waste management	
Nuclear							

Certification Criteria approved
 Criteria under development
 Due to commence

08/2021

Appendix II. Pending List explained

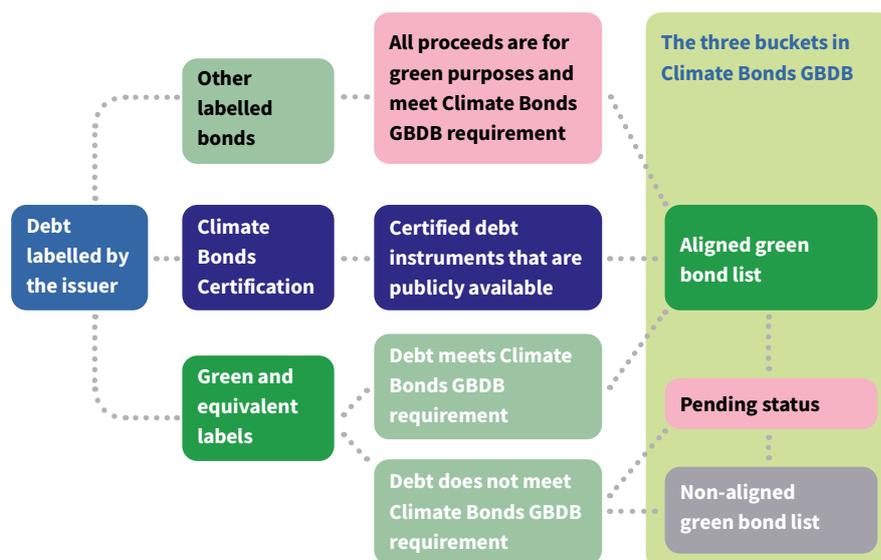
Climate Bonds follows the above process to screen green bonds aligned by green definition. In some cases, the information available on the public deal's UoP is insufficient for an immediate decision on inclusion or exclusion from the GBDB. Such bonds are bucketed into the Pending List, and further work is undertaken to obtain or clarify information. Climate Bonds contacts the issuer, underwriter, rating agency, or the green bond external review provider (if applicable) for further investigation. If no further information is made available or the obtained information does not confirm sector alignment 90 days after the bond is considered, and/or other database requirements are still not met, the bond is added to the Aligned Green Bond List or Non-aligned Green Bond List, as appropriate.

There are three main factors leading to non-alignment:

1. Proceeds allocated to working capital that is not linked to green projects/assets;
2. Proceeds used for financing projects that are not in line with Climate Bonds Taxonomy, and
3. Lack of information on the use of proceeds.

On 28 February 2022, Chinese labelled green bonds issued in 2021 remaining in the Pending List, pending further confirmation to be included or excluded have a cumulative volume of USD6bn (RMB38.6bn). Chart 24

Transparency and completeness of information from issuers are essential to determine a bond's alignment with market standards and green taxonomies. While a lack of granularity may have been understandable at inception of the green bond market, as the market has matured, expectations have changed, and investors now



want more precise definitions and reporting of eligible green project categories. Key challenges of determining the alignment of what is often a rather broad list of categories include:

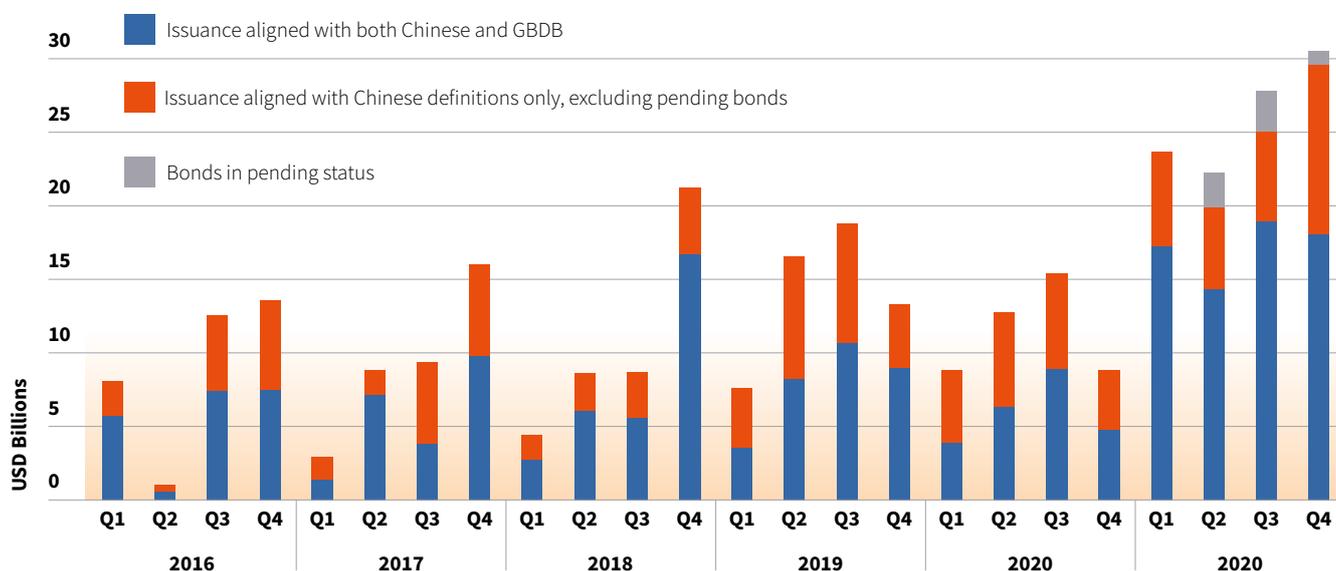
- **Building retrofits** is a project category that has often been found to be inadequately described. Since buildings contribute substantially to global GHG emissions and energy consumption, any serious reduction effort should explicitly address the carbon mitigation aspect and energy savings opportunities of retrofitting projects. Good practice in energy efficiency in the buildings sector has included a minimum 20-30% energy efficiency target for the whole category. Numerous issuers do not provide detail on this.
- **Hydropower and geothermal energy generation** are often presented with no

eligibility threshold. Frameworks that are in line with market practice have included emissions intensity for such projects, expressed in terms of the average gCO₂e/kWh electricity generated over the lifetime of the asset.

- **Sustainable agriculture** has appeared with increasing frequency in recent frameworks. The definition of this category is often rather opaque and can be a dissuading factor in assessing the eligibility of the offering, as issuers seldom provide details on the types of agricultural activities and methods of production covered.

As standard practice, issuers should include robust pre-issuance UoP disclosure, ideally including thresholds and improvement targets for each asset and/or project to provide more clarity on the materiality of the investment.

Quarterly issuance by value (2016-2021)



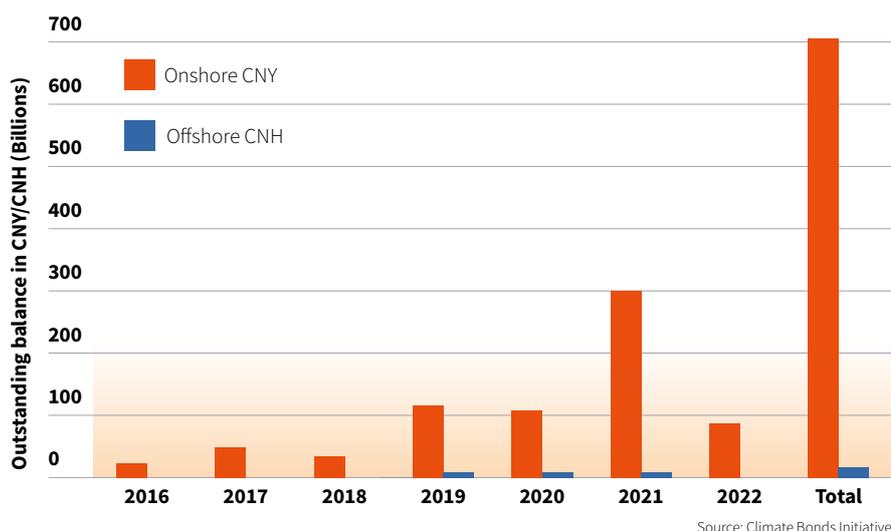
Source: Climate Bonds Initiative

Appendix III. External review types

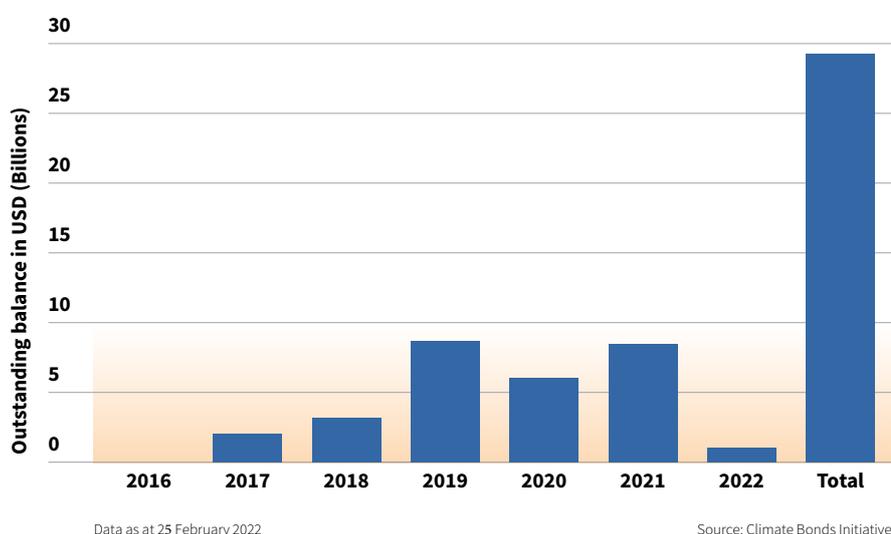
General description of different types of external review (global definition).		
Type of review	Scope	Provider
Assurance	Positive or negative assurance on compliance with the Green Bond Principles (GBP) or the Green Loan Principles (GLP)	EY, Deloitte, KPMG, PwC, etc.
Second Party Opinion (SPO)	Confirm compliance with GBP/GLP. Provide assessment of issuer's green bond framework, analysing the 'greenness' of eligible assets	CICERO, Sustainalytics, DNV GL, Vigeo Eiris, ISS-Oekom, Lianhe Equator, SynTao Green Finance, etc.
Green rating/evaluation	Rating agencies assess the bond's alignment with the GBP and the integrity of its green credentials	Rating agencies such as S&P Global Ratings, JCRA, RAM Holdings etc.
Pre-issuance verification (Climate Bonds Certification)	Third party verification confirms that the UoP adheres to the Climate Bonds Standard and sector-specific criteria	Approved Verifiers under the Climate Bonds Standard

Appendix IV. Outstanding balance

RMB denominated Chinese green bonds by Climate Bonds definition



USD denominated offshore Chinese green bonds by Climate Bonds definition



Appendix V. CCDC: ChinaBond Green and Sustainability Index Series

The ChinaBond Green and Sustainability Index Series is a series of indices covering three major categories: green, carbon and ESG.

The green index series includes labelled green and aligned green bond indices (non-labelled bonds that are actually financing green assets). Examples of carbon indices include

the ChinaBond-Carbon Neutrality Green Bond Index and China Bond China Carbon Emission Allowance (CEA) Pricing Index, the first of its kind in the country. The ChinaBond ESG Evaluation System covers public credit bonds in China. Based on this, the ChinaBond ESG Preferred Credit Bond Index was developed.

Performance of the ChinaBond Green and Sustainability Index Series in 2021

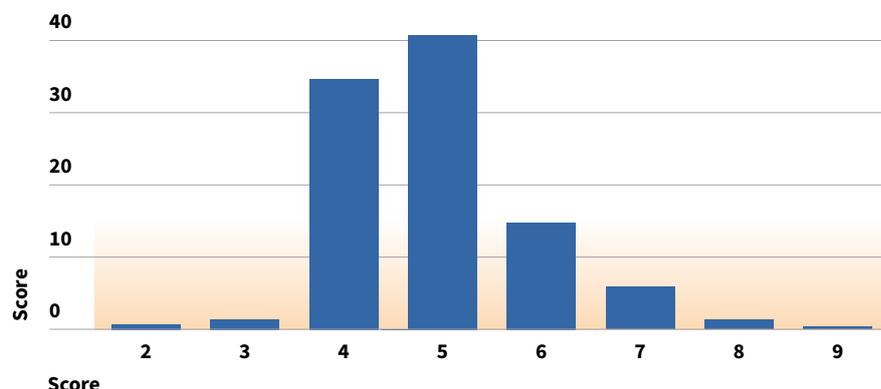
Index	Bench- mark	Duration	Yield-to- maturity (%)	Market- cap (100 million yuan)	Annualised rate of return(%)			Sharpe ratio			Green percent- age (%)
					1-year	3-year	Histor- ical	1-year	3-year	Histor- ical	
ChinaBond China Green Bond Index	2009-12-31	5.24	3.20	48120.14	5.74	4.76	5.06	2.53	1.36	0.84	85.49
ChinaBond China Green Bond Select Index	2009-12-31	5.21	3.20	43424.34	5.76	4.76	5.01	2.48	1.35	0.76	85.68
ChinaBond China Climate Aligned Bond Index	2009-12-31	3.32	3.02	13082.03	4.97	4.58	4.93	2.45	1.32	0.63	99.35
ChinaBond-Carbon Neutrality Green Bond Index	2021-02-26	2.38	2.82	2248.04	--	--	5.80	--	--	--	82.75
ChinaBond-Green Bond Composite Index	2016-12-31	1.92	3.18	7757.85	4.70	4.37	4.37	3.74	1.74	1.23	87.94
ChinaBond-Mid- High Grade Green Financial Bond Index	2018-06-29	1.22	2.69	2381.04	3.72	3.80	4.29	4.28	1.59	1.87	99.74
ChinaBond-HighGrade Green Corporate Credit Bond Index	2017-12-31	2.20	3.01	3930.73	4.98	4.61	5.70	2.99	1.40	1.76	84.91
ChinaBond-ESG Preferred Credit Bond Index	2018-08-31	2.27	3.27	72169.29	4.77	4.50	4.83	3.23	1.67	1.92	--

Appendix VI. CCDC: Observations on ESG practice in the domestic bond market

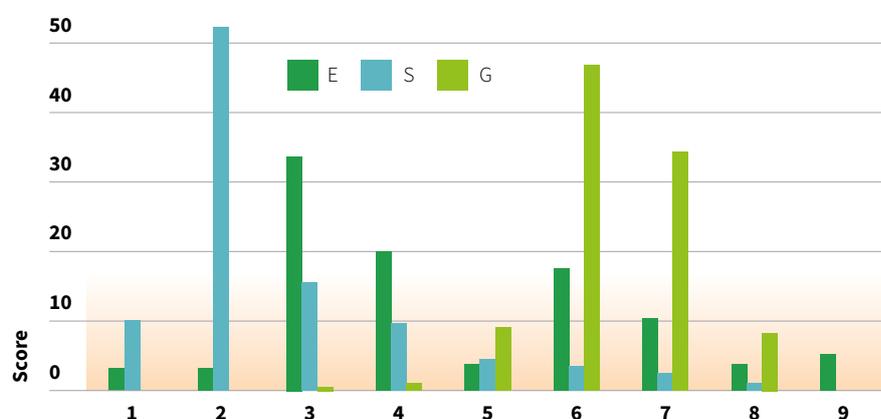
Key findings from the ChinaBond ESG Evaluation System:

1. As of the end of 2021, the distribution of ESG scores of bond issuers in the past three years was close to a normal distribution. The average score of corporate governance was significantly higher than that in environmental and social responsibility dimensions.

ChinaBond ESG score distribution in 2021



ChinaBond E, S, and G score distribution in 2021



2. Water conservancy, environment and public facilities management scored the highest among industries. Ranking and scores are as following.

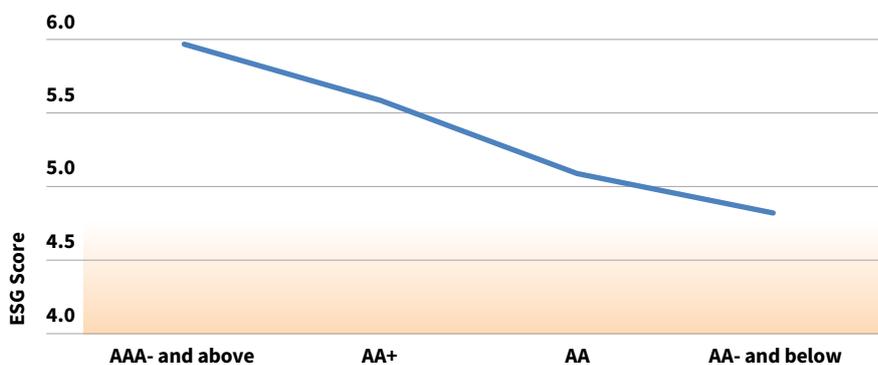
Industry	Number of companies	Average ESG score
Water conservancy, environment and public facilities management	44	6.00
Electricity, heat, gas and water production and supply industry	227	5.64
Wholesale and retail trade	206	5.56
Manufacturing	379	5.36
Transportation, warehousing and postal Industry	205	5.25
Financials	729	5.24
Leasing and business services	242	5.08
Conglomerate	97	4.97
Real estate	267	4.95
Mining	70	4.80
Buildings	1509	4.36
Overall	4050	4.93

3. The Central SOEs category had higher average ESG score than local SOEs and private companies.

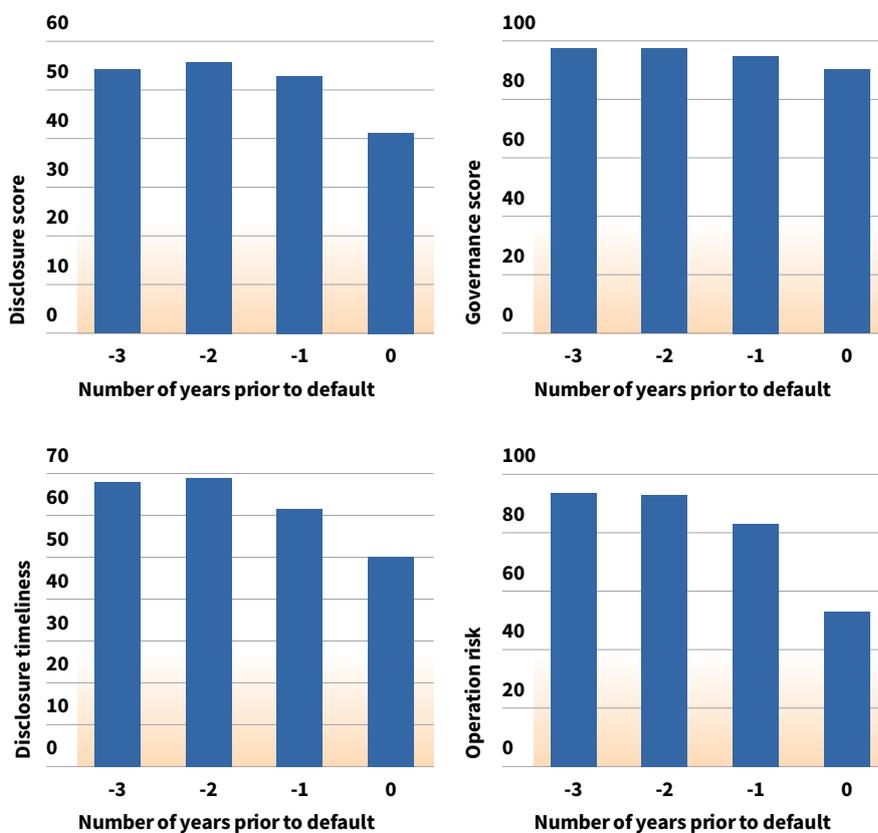
Entity nature	Average ESG score	Average E score	Average S score	Average G score
Central SOEs	5.51	5.42	3.80	6.59
Local SOEs	4.84	4.31	2.55	6.44
Private companies	4.91	5.49	2.98	5.80

4. ESG evaluation can serve as a leading indicator in corporate default warning.

ChinaBond Market Implied Ratings and ESG scores in 2021



Governance-related scores began to deteriorate two years before corporate defaults



Appendix VII. CCDC: ChinaBond Environmental Benefit Disclosure Indicator System and Database

CCDC developed the ChinaBond Green Bond Environmental Benefit Disclosure Indicator System (the Indicator System) and the ChinaBond Green Bond Environmental Benefit Database (the Database). The Indicator System is comprised of 38 general indicators and 11 sector-specific ones, covering all 205 sectors set out in the Green Bond Encoursed Project Catalogue (2021 Edition). For details, please refer to [the Database](#) and [the Portal](#).

Endnotes

1. Total labelled issuance in the domestic and overseas market more than doubled (2.4 times) to USD109.5bn (RMB706.3bn) from a year earlier.
2. Climate Bonds reclassified issuer type in 2021, removing ABS as a category. The analysis in this report is within the universe of green bonds aligned with Climate Bonds definition, unless otherwise specified.
3. An 2021 average USDCNY exchange rate of 6.4529 is used for conversion between USD and RMB in this paper, unless otherwise stated.
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