



Japan

Cumulative green bond issuance: USD9.7bn (10th in global country rankings)

2018 issuance: USD4.1bn, up 22% from 2017, 42% of total issuance to date, 12th in 2018 country rankings

Growth expected from local governments and government-backed entities, and non-financial corporates

A growing green bond market driven by corporate issuers

Japan is a densely populated country with the third-largest economy in the world. Its well-developed capital markets have given rise to a bond market worth more than USD10tn, which is the third in size globally after the United States and China.¹

Japanese entities have been issuing green bonds since 2014. Japan's green bond market is the 12th largest globally and 2nd largest in Asia-Pacific, after China. Development Bank of Japan and financial corporates have driven volume, but non-financial corporates have become more active in the last three years. In 2017, the Ministry of Environment published Japan's Green Bond Guidelines, and in 2018, Tokyo Stock Exchange launched a green and social bond platform.

The market has demonstrated impressive growth. The largest increase took place between 2016 and 2017 with a year-on-year growth rate of 204%, underpinned by corporate issuance.

Strong issuance growth is driven by corporates

Development Bank of Japan was the first Japanese green bond issuer and is the largest Japanese issuer to date. DBJ has issued four green bonds, including the largest Japanese deal to date. The USD1bn bond, issued in October 2017, contributed nearly a third the year's volume and was earmarked for financing green buildings, renewable energy and environmentally-rated enterprise loans.

The other top five issuers are all corporates, and account for 72% of the USD9.7bn issued to end-2018.² Further strong financial and non-financial corporate issuance can help scale the market rapidly.

Financial corporate issuers have contributed half of all issued green bond volume to date. Banks have been particularly active: three of the top five issuers are commercial banks. Mitsubishi UFG, the fifth-largest bank in the world by assets,³ has issued close to USD2bn. It is also the largest Japanese underwriter of green bonds, capturing 15% by volume and 17% by number of deals. This underscores the importance of banks in scaling up the market.

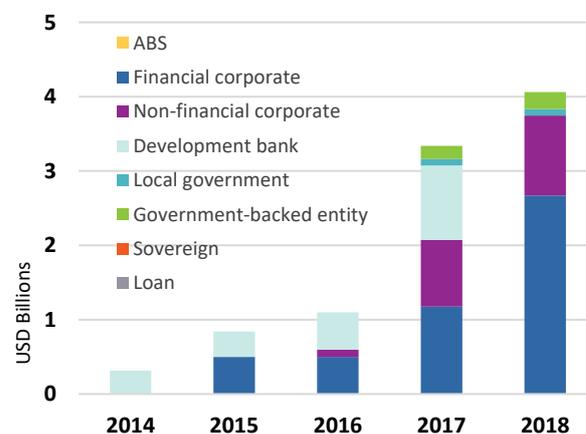
Real Estate Investment Trusts (REITs) are another important category. They make up 12% of issuance by bond count, although the issued bonds to date have been at the lower end of deal sizes.

Non-financial corporate issuers have contributed USD4.8bn or 21.6% of cumulative volume. Over half (53%) of that issuance is attributable to construction and real estate. Some issuers come from sectors that are not well represented globally, such as shipping (NYK, Mitsui O.S.K. Lines), consumer goods (Marui Group) and industry (Hitachi Zosen). The USD710m bond from Toyota Finance in 2017 is the largest corporate bond to date.⁴ Japan's strong manufacturing bias could accommodate more such deals.

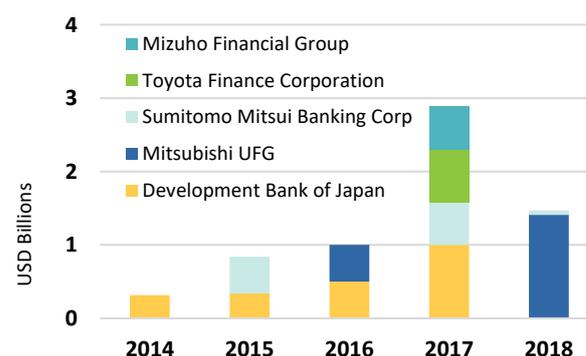
Japanese green bond innovations span issuer sectors and instrument types

- Nomura Research Institute was the first non-U.S. entity in the education and research sector to issue a green bond in 2016, paving the way for later green bond issuance from Australian and Malaysian institutions.
- NYK was the first shipping company globally to issue a green bond in May 2018.
- Sumitomo Forestry completed another world-first in September 2018 by issuing a convertible green bond to finance sustainable timberlands in New Zealand.

Financial corporates are the dominant issuers



Top 5 issuers account for two thirds of issuance



Sub-sovereign issuers have yet to take an active role in Japan.

Tokyo Metropolitan Government is the only local government and Japan Railway Construction, Transport and Technology Agency (JRRT) is the sole government-backed entity to have accessed the green bond market. The public sector is expected to tap the market to fund sustainable infrastructure to deliver on NDC commitments.

Over a third of proceeds are allocated to buildings

Property financing has been popular, with significant allocations from DBJ, the top 3 banks and Tokyo’s bond, as well as funding for REITs and owned buildings in the case of airline ANA Holdings and Nomura Research Centre.⁵ Japan’s CASBEE certification scheme, which assesses the energy efficiency of buildings, makes it easier to identify low-carbon buildings and metrics suitable for green bond issuance, so we foresee growth in commercial property financing.

The next largest sector is energy (31% of allocations), followed by transport (22%).⁶ Energy projects often relate to solar power, but also offshore wind (e.g. Toda Corporation) and, from the waste management sector, waste-to-energy (e.g. Hitachi Zosen).

91% of green bonds have an external review

91% of issuance by volume and by deal count benefits from an external review. These are mostly second-party opinions (SPOs). Sustainalytics is the largest SPO provider by volume (72%) and by deals (53%). DNV GL, Vigeo EIRIS and ISS-oekom also provide SPOs. Since 2016, R&I Japan has provided green bond ratings on 8 deals, totalling USD753m. JCRA has assessed 3 green bonds (USD335m).

Certification under the Climate Bonds Standard and sector criteria presents an opportunity to spotlight assets and projects that are aligned with keeping global warming under 2°C. It can foster greater investor confidence and provide reputational benefits.

Post-issuance reporting is commonplace for green bonds. Issuers have reported on all outstanding bonds issued before November 2017. In total, eight issuers committed to reporting. Five disclosed both use of proceeds (UoP) and impact metrics, which accounts for 56% of issuance; three reported only on allocations. For one bond with no explicit commitment at issuance, the issuer disclosed both UoP and impact metrics, in line with its second green bond, which suggests that repeat issuance could improve market transparency.

Japanese issuers most often issue in Euro

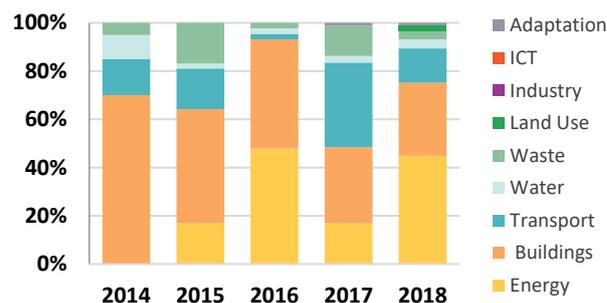
EUR is the most popular denomination currency among Japanese green bond issuers. Deals in USD and JPY account for nearly all the rest. Mitsubishi UFG, Sumitomo Mitsui Banking Corp and Mizuho Financial Group have all issued benchmark bonds in EUR, while DBJ has issued EUR550m. Sumitomo also issued once in AUD.

Notably, however, foreign issuers have issued deals denominated in JPY (Samurai bonds) to access the large Japanese investor base.⁷ Bank of China’s JPY30bn (USD264m) Certified Climate Bond will finance public transport and a sewage plant in China. French bank Credit Agricole has issued 10 green *Samurai* bonds (USD307m) since 2013. Canadian Solar issued a solar ABS deal and a green loan. The World Bank, African Development Bank and Norway’s KBN have issued environmentally-themed *Uridashi* (retail) bonds.

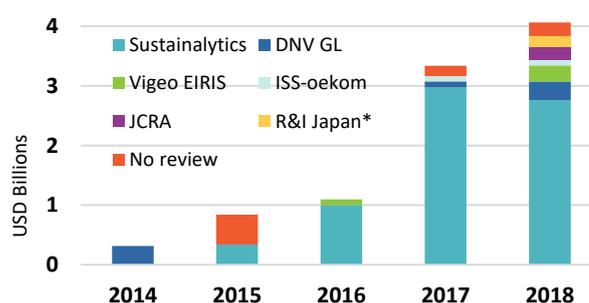
Benchmark-sized deals dominate issuance

Benchmark-sized deals (USD500m or more) account for less than a quarter of the bond count but for almost two-thirds of issuance to date. This is driven by the high level of participation of financial institutions and large corporates in the Japanese market.

35% of proceeds are allocated to buildings

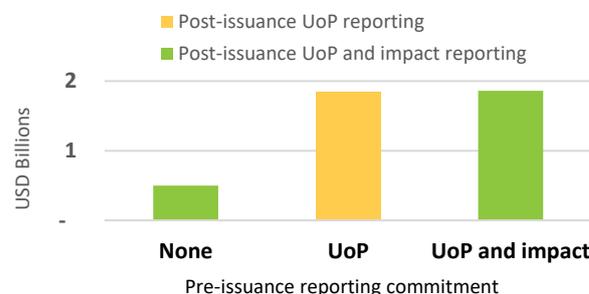


91% of issuance has an external review

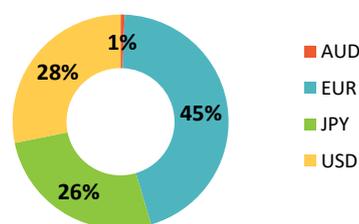


*Note: *R&I has rated 8 bonds, totalling USD753m. The two, which have no other external review are included in the chart: they amount to USD189m. The other 6 have an SPO, and have been included in the figures of the respective SPO providers.*

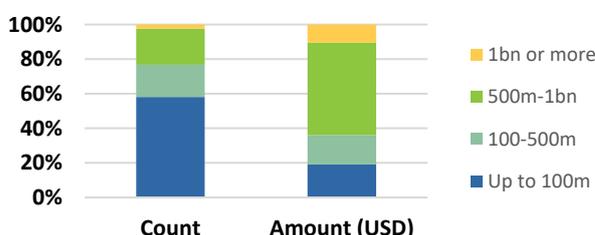
All outstanding bonds have post-issuance reporting



45% of deal volume from Japanese issuers is in EUR



Benchmark-sized bonds represent 64% of issuance

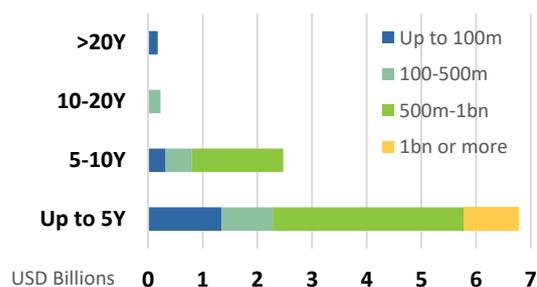


Most green bonds have tenors of up to 5 years

Japanese issuers favour green bonds with shorter tenors: 70% of issued volume has a term at issuance of up to five years. The equivalent global figure is only 37%. Shorter tenors are particularly popular on benchmark size bonds (USD500m or more).

Long-term bonds with a maturity of 10 years or more comprise 4% of the Japanese green bond market and are associated with the public sector. Tokyo Metropolitan Government’s two JPY10bn green bonds from 2017 and 2018 both have a term of 30 years. The next longest maturities are on JRTT bonds: 10 years for both.

70% of issued volume has a tenor of up to 5 years



There is significant potential for future green bond issuance

Low-carbon residential property could unlock further scale for the Japanese property market

Issuance secured on residential properties is supported by the fact that Japanese local governments are building new apartments aggressively. For example, Tokyo adds approx. 100,000 surplus homes every year.⁸ New stock is built to increasingly higher energy efficiency standards. But refurbishment loans to improve efficiency for landlords and owner-occupiers represent a further opportunity.

The Japanese residential mortgage-backed security (RMBS) market has experienced consistent growth and has experienced low levels of defaults and delinquencies over the last decade.⁹ According to the Japan Securities Dealers Association, the RMBS market stood at USD156bn in September 2018: just under a quarter of the size of Japan’s corporate bond market (USD668bn).¹⁰ This speaks to scale.

Japan Housing Finance Agency (JHF), REITs and large housing corporations could address demographic and lifestyle changes impacting the Japanese population by creating climate-resilient, energy efficient housing and refurbishing properties to high energy-efficiency specifications. The Climate Bonds Standard offers the possibility to certify building upgrade projects if they meet a carbon reduction target calculated based on the bond’s term.

Climate-aligned issuance shows potential in transport, certified forestry and paper

Climate Bonds has conducted research on climate aligned issuers that operate in climate-friendly sectors such as clean energy, public transport and certified forestry.¹¹

We identified 13 Japanese issuers with USD11.9bn outstanding bonds as of June 2018. 93% of their aligned outstanding debt is rated investment grade, mostly AA (USD8.5bn). Only 3% is unrated.

Top 5 Japanese climate aligned issuers feature 3 in transport

Issuer	Outstanding (USD)	CBI Sector
Central Japan Railway	5.6bn	Transport
Tokyo Metro	2.2bn	Transport
Kansai Rapid Railway	690m	Transport
Daio Paper	607m	Land use*
Oji Holdings	566m	Land use*

*Notes: Data as of 30/06/2018. * Sustainable land use includes certified forestry and related products, e.g. pulp, paper and packaging.*

By far the largest sector is rail/metro transport with USD8.8bn outstanding. Clean energy is represented by Japan Atomic Power, and the buildings sector by materials and equipment manufacturers Wood One and Stanley Electric. However, certified forestry and products is the second largest sector with USD2.6bn aligned outstanding amount from 6 issuers, of which 4 fully-aligned. Only Sumitomo Forestry is a green bond issuer.

As transport financing is long-dated (78% had a tenor of 10 years or more at issuance), over 60% of the outstanding climate-aligned bonds have a long-dated maturity. However, USD2.1bn of debt matures in 2019/20, presenting an immediate opportunity to refinance in the green bond market.

Labelling bonds green brings visibility to the positive contributions of companies towards limiting global warming to 2°C. Issuer commitments to report on use of proceeds and impact metrics, could also strengthen their appeal to the rising number of sustainability-focused investors.

Japan’s manufacturers could underpin growing demand for green bonds

The Green Finance Japan Network was set up in late 2018 to mainstream ‘greenness’ in the Japanese financial market. A legislative push, including the National Adaptation Plan, has engaged corporations in the wider climate agenda.^{12,13} The transition to a low-carbon economy is likely to be an integral part of the risk management of carbon-intensive industries.

Given that Japan’s exports largely consist of heavy industry,¹⁴ these trends are supportive of more issuance from the manufacturing sector, both from existing issuers such as Toyota and Ricoh, and new ones such as Daikin:

- **Toyota**, the largest automotive manufacturer in the world, is targeting a 90% vehicle CO₂ emissions reduction by 2050 relative to a 2010 baseline. It has issued ABS and a bond to finance sales of low- and zero-emission vehicles but could now issue e.g. Auto ABS secured on LEV/EV vehicle loans.
- **Ricoh**, an equipment manufacturer for office automation, computing and photography, is aiming for all its products to be part of the Ricoh Sustainable Products Program by March 2020. Ricoh Leasing’s green bond refinanced 11 solar power generation facilities. There is scope to fund other products.
- **Daikin**, the world’s largest manufacturer of air conditioning systems, is targeting zero emissions from its products by 2050. The positive impact for buildings can be significant.



\$ The public sector can harness private capital to fund climate change mitigation and adaptation

Public sector entities are pivotal in the development of the green bond market. Not only is investment in infrastructure required to create, maintain and enhance public services, but infrastructure needs to be sustainable and resilient to the effects of climate change to deliver on long-term social goals.

In Japan, the urgency for resilient infrastructure is even more acute. In 2018, the most catastrophic rains in decades resulted in floods and landslides that caused the death of more than 200 people.¹⁵ WWF estimates that 46% of Japan’s population and 47% of its industrial output are at risk from climate-related impacts, including storm surges, typhoons and sea-level rise.^{16,17} After the 2011 tsunami and the resulting Fukushima nuclear disaster, Japan requires infrastructure and systems to build long-term resilience.¹⁸

Green bond issuance by government and related entities can facilitate investment by attracting private capital. To scope out public sector potential we looked at local government bond issuance. We found that the top 10 issuers have JPY33.7tn (USD307bn) outstanding, or 44% of the JPY76.3tn total from 153 city and prefecture issuers, based on Bloomberg data.

Tokyo Metropolitan Government, which has already placed two green bonds, is the largest such issuer with 233 bonds totalling JPY7.1tn (USD64bn). Osaka, Aichi and Saitama prefectures are the next largest and all have a climate change strategy in place. Saitama Prefecture, for instance, has focused on adapting to climate change by reducing the heat island effect in the city.

Top 5 Japanese local government bond issuers

Issuer	Outstanding bonds	
	Bonds	USDbn
Tokyo Metropolitan Government	233	64.4
Osaka Prefecture	247	40.1
Aichi Prefecture	219	30.9
Saitama Prefecture	177	28.9
Kanagawa Prefecture	166	26.7

Sources for this section: Refinitiv EIKON for issuer-level bond data, Bloomberg and company websites. Climate Bonds Initiative analysis.

36 out of Japan’s 45 local governments currently participate in the **Major Joint Local Government Bond** (JPY14tn/USD128.6bn outstanding). Each participant bears individual responsibility for repaying the total amount, making the bonds very low-risk. Financing purposes include operating public enterprises (e.g. transport, utilities, sewage); building schools, hospitals and emergency facilities, as well as infrastructure development.¹⁹

We also looked at state-owned entities. Bond issuers include international finance institutions and agencies involved in housing finance, agriculture and forestry, water and urban development. In addition to green bond issuer DBJ, other large entities could perhaps benefit from green bond issuance.

Japan Finance Organization for Municipalities (JFM) is a local government financing agency, fully owned by municipalities. With 1083 bonds and JPY42tn (USD387bn) outstanding, it is one of the largest sub-sovereign issuers. The LGFA funds public infrastructure, services and disaster prevention. Most LGFAs from Scandinavia are repeat green bond issuers.

Japan Bank for International Cooperation (JBIC) is an export credit agency with JPY5.3tn (USD48.8bn) outstanding. It funds infrastructure projects such as high-speed rail, solar and wind farms, geothermal and waste-to-energy plants: all suited to green bond issuance. Import-export banks were among the first green bond issuers in South Korea, Canada, India, Sweden.

Japan Housing Finance Agency (JHF) has 250 bonds outstanding (JPY3.9tn/USD35bn). It provides financing to private lending institutions and refinances itself through securitisation deals. It can leverage its pivotal role to promote the building of new low-carbon housing and energy efficiency upgrades to existing stock. In the US, Fannie Mae uses its Green MBS program to do just that. JHF already includes housing compliant with Japan’s Flat 35S energy efficiency scheme in RMBS deals. In January 2019 it closed a JPY10bn (USD91m) labelled green bond.

Japan Finance Corporation has 69 bonds and outstanding (JPY1.6tn/USD14.7bn). It provides loans to small- and medium-sized companies, including for agriculture, forestry, fisheries and crisis response. Green bonds can fund the sustainable use of natural resources and climate-change resilience measures. Acting as an aggregation platform for SME loans can help extend the reach of capital markets into the wider economy.

Endnotes: 1. Bank for International Settlements: Debt Securities Statistics, 2018. 2. Globally, financial and non-financial corporates issued 39% of the 2014-2018 green bond volume (CBI data). Country and issuer-type classifications are according to CBI’s methodology. 3. Global Finance Magazine, Saunders, 2018. 4. Toyota Finance Corporation is a subsidiary of Toyota Motor Company. In 2014-2016, Toyota Financial Services issued 3 Auto ABS with recourse to US assets, so they count towards US issuance. 5. Financing low-carbon buildings and energy efficiency in the green bond market, CBI, 2019. 6. Global figures: 24% Buildings, 35% Energy, 15% Transport (CBI data). 7. Samurai bonds are not included in Japan figures. 8. Tokyo Statistical Yearbook, 2017. 9. Markets: Asia Bond Monitor and JSDA. Credit metrics: S&P and Moody’s, 2018. 10. JSDA, 2018. 11. See the Climate Bonds Taxonomy (sectors) and Bonds and Climate Change: The State of the Market 2018, CBI. 12. Japanese Cabinet’s National Plan for Adaptation to the Impacts of Climate Change, 2015. 13. Climate Change Good Practices by Japanese Private Sector, MUFJ Morgan Stanley for the Ministry of Economy, Trade and Industry, 2017. 14. The OEC, MIT Media Lab, 2019. 15. Xinhua Asia & Pacific Edition, 2018. 16. Nippon Changes: climate impacts threatening Japan today and tomorrow, Case, Tidwell, 2008. 17. Report on Assessment of Impacts of Climate Change in Japan and Future Challenges, Central Environment Council, 2015. 18. CBI has convened the Adaptation & Resilience Expert Group to develop best practice for investment. 19. Japan Local Government Bond Association, 2019.

Japan has a favourable climate policy approach

Japan set out its climate change policy in 2016 in its “*Plan for global warming countermeasures*” (the Plan), which addresses the main areas of action to meet the country’s Nationally Determined Contribution (NDC) and the goals set in the Paris Agreement.

Japan is targeting GHG emissions reduction of 26% by 2030 and 80% by 2050. Decarbonisation of the power generation sector has however become challenging as a result of the Fukushima’s nuclear reactor explosion in 2011. To fill the electricity supply gap created by the sudden shutdown of nuclear power plants, Japan has had to import and burn fossil fuels to meet energy demand. This has come at the expense of a substantial increase in carbon dioxide emissions.

Plan for global warming countermeasures

The Plan comprises policies and measures to be implemented across different sectors to meet Japan’s NDCs. Monitoring and evaluation mechanisms as well as annual review of the Plan are crucial for steady implementation.

The Plan highlights key measures targeting the role of local and national government, businesses and citizens as well as reduction of GHG emissions. A number of quantified targets are identified:

-  100% use of highly efficient light such as LED by 2030 in both the residential and commercial sector;
-  Increased use of low-emission vehicles, with a target of 50-70% of electric and fuel cells vehicles for new car sales.

Japan remains a worldwide leader in technological development, which has helped improve energy efficiency across a number of sectors. Energy efficiency represents a key factor in meeting the NDCs, along with an increased deployment of renewables perhaps via the introduction of a revised feed-in tariff.

Conclusions and actions to support further market development

Japan’s ambitious climate strategy highlights the opportunity to leverage green bonds in financing projects, which support the “*Plan for global warming countermeasures*” and Strategic Energy Plans.

Japan has a very large bond market. Japan’s **Government Pension Investment Fund**, for instance, is the world’s largest pension fund, and one of its four investment principles, stewardship, expressly includes the consideration of ESG factors. As of year-end 2018, 28.2% of its JPY151tn (USD1.4tn) portfolio was invested in domestic bonds. A strong institutional investor base is conducive to growing the green bond market, particularly given the ESG angle.

Climate risk is already one of several strategic priorities for Japan’s financial regulator, the **Financial Services Agency**, as it seeks to ensure the stability of the financial system.

To date, however, the green bond market remains relatively small. Both public and private sector action is required to scale up issuance and investments to meet the country’s environmental targets. The Green Finance Network Japan provides a platform for private sector engagement with the green finance agenda. Some approaches that could be applied to channel capital to climate investments include:

- **Improve the visibility of green bonds to analysts and investors** by listing on TSE’s dedicated green bond platform, publishing external reviews and providing deal summaries in English.

Green bond policies have been introduced



Green bond guidelines (Ministry of Environment, 2017)

The Ministry of the Environment (MoEJ) launched the Japanese Green Bond Guidelines in 2017. Green bond guidelines support the expansion of issuance, and seek to promote market integrity and transparency through disclosure.

The Japanese guidelines comply with the ICMA Green Bond Principles (GBP), and cover identification of eligible categories, project evaluation and selection, monitoring and reporting. Notably, they also promote the use of external reviews. To facilitate adoption, they provide practical examples, including on post-issuance reporting, environmental impact metrics and calculation methods.



Financial Support Programme for Green Bond Issuance (MoEJ, 2018)

Last year, MoEJ introduced a Financial Support Programme for Green Bond Issuance. Subsidies in the form grants of up to JPY50m per issuance are now available for expenses in respect of external services in the form of granting external reviews, consultation on establishing a green bond framework, etc. Grants are provided to deals with external reviews, which confirm compliance with the GBP, ASEAN Green Bond Standard, Climate Bonds Standard, etc., taking into account the issuing market and the investor group. Compliance with Japan’s Green Bond Guidelines is confirmed by an external review organization prior to issuance.

- **Promote disclosure of climate-related financial risks**, e.g. by supporting the implementation of the recommendations of the Task Force for Climate-related Financial Disclosure (TCFD). Investors and lenders should seek greater climate-risk disclosure from companies, and in turn strive to enhance climate-risk disclosure for their investment/lending portfolios.
- **Green-tagging loans and investments** in climate-change mitigation, adaptation and/or resilience projects can form the basis for quantifying and addressing the climate-related risks of lenders and investors. Banks and other lenders could use green tagging to quantify green bond funding needs, and act as aggregation platforms for smaller companies and projects, for which direct bond issuance may not be economical.
- **Set up green infrastructure and/or green bond funds**. For instance, the Asian Development Bank set up the Climate Change Fund to facilitate the financing of projects which address climate change and lead to reduced GHG emissions.
- **Benchmark deals from both large public sector issuers and large corporates** send a strong signal to the market on the intention of government and companies to support the transition to a low-carbon economy. Demonstration issuance has the power to mobilise stakeholders to further action.

How to issue a green bond/loan

Who can issue green bonds?

Any entity which has suitable green assets can issue green bonds, green sukuk or obtain a green loan. Suitable green assets include renewable energy, low carbon transport, low carbon buildings, sustainable water and waste management, sustainable land use as well as climate change adaptation measures such as flood defences.



1 Develop a green bond framework

- Define eligibility criteria for projects/assets
- Create selection process
- Set up tracking & reporting

Available guidelines & standards:

International: Green Bond Principles (GBP), Green Loan Principles, Climate Bonds Taxonomy and Climate Bonds Standard

Regional: ASEAN Green Bond Standards

Country-specific: Ministry of Environment Japan (MOEJ) green bond guidelines & taxonomy



2 Best practice: Arrange an external review



Assurance report: an external party confirmation of compliance with GBP/GLP

Second Party Opinion: an external assessment of the issuer's green bond framework, confirming GBP compliance and analysing the eligible asset categories

Green rating: an evaluation of the green bond and framework against a third-party rating methodology, which considers the environmental aspects of the investments. These include products developed by international and local rating agencies such as R&I and Japan Credit Rating Agency

Verification report for Certified Climate Bond: third party verification, pre- and post-issuance, which confirms that the use of proceeds adheres to the Climate Bonds Standard and Sector Criteria and the Paris agreement to keep global warming to 2°C and achieve full decarbonisation by 2050

3 Check for local subsidies & support mechanisms:

Japan: Financial Support Programme for Green Bond Issuance provides subsidies in the form grants of up to JPY50m per issuance to green bond issuers to cover the additional costs associated with obtaining support from expert third-parties such as external review entities, green bond consulting firms and structuring agents



4 Issue the bond, loan!



5 Post-issuance reporting

Report annually to confirm that the funds are allocated to green projects / assets

Best practice: Disclose environmental impacts of financed projects in absolute terms and relative to an appropriate benchmark



Authors: Monica Filkova, CFA, Krista Tukiainen and Amanda Giorgi

© Published by Climate Bonds Initiative, February 2019

www.climatebonds.net

Disclaimer: The information contained in this communication does not constitute investment advice in any form and the Climate Bonds Initiative is not an investment adviser. Any reference to a financial organisation or debt instrument or investment product is for information purposes only. Links to external websites are for information purposes only. The Climate Bonds Initiative accepts no responsibility for content on external websites. The Climate Bonds Initiative is not endorsing, recommending or advising on the financial merits or otherwise of any debt instrument or investment product and no information within this communication should be taken as such, nor should any information in this communication be relied upon in making any investment decision. Certification under the Climate Bond Standard only reflects the climate attributes of the use of proceeds of a designated debt instrument. It does not reflect the credit worthiness of the designated debt instrument, nor its compliance with national or international laws. A decision to invest in anything is solely yours. The Climate Bonds Initiative accepts no liability of any kind, for any investment an individual or organisation makes, nor for any investment made by third parties on behalf of an individual or organisation, based in whole or in part on any information contained within this, or any other Climate Bonds Initiative public communication.