

Financing low-carbon buildings and energy efficiency in the green bond market

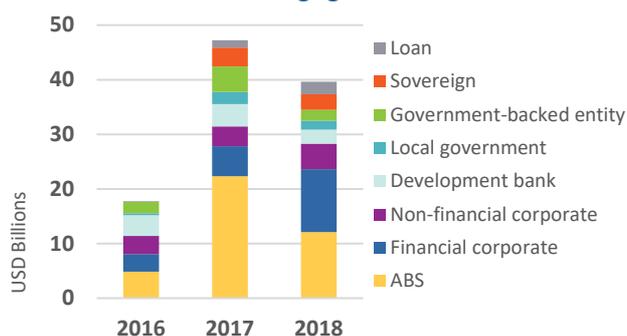
Japan is a key player in the development of energy efficiency measures and technological innovation. There are substantial opportunities to leverage green bonds to finance low-carbon buildings and energy efficiency in the country. Issuance across the world shows that capital markets can be accessed to finance energy efficiency and buildings. Financing climate adaptation and resilience also presents opportunities for Japan.

Introduction to Building sector green bonds

The imperative: The decarbonisation of the buildings sector is paramount. It accounts for around 28% of total global energy-related CO₂ emissions, according to the UN's "Towards a zero-emission, efficient, and resilient buildings and construction sector" 2017. The projected world population growth, combined with the need for greater energy access across the globe will dramatically increase the overall energy demand in the sector and its related carbon emissions.

The opportunity: Directing significant proportions of investments towards low-carbon buildings and energy-efficient equipment and building materials provides substantial opportunities to offset future energy demands and CO₂ emissions. Using green bonds to raise financing leverages a market that has gained increasing prominence and acceptance.

Securitisation and financial corporates dominate buildings green bond issuance



Size of the buildings green bond market: In 2017, 59% of all energy efficiency investments went towards the buildings sector, according to the IEA's *World Energy Investment 2018* report.

In the green bond market, issuers have allocated proceeds to fund low-carbon buildings and energy efficiency, employing a variety of green bond structures and initiating a green securitisation market. As of end November 2018, USD126bn had been allocated to low carbon buildings assets and projects. Securitisations – asset backed securities (ABS) and mortgage backed securities (MBS) – represent a significant share of the green bond market. Financial corporates – particularly mortgage banks and property lenders – have allocated USD24.2bn for low carbon buildings from their green bond issuance.

About this briefing

This briefing provides an overview on how fixed-income instruments have been used to finance investments in low-carbon buildings. **All 2018 data is as of 30 November 2018.**

Green bond proceeds can be fully allocated to finance projects in a specific sector, or they can be 'split' across a number of sectors. Usually, issuers' intention on proceeds allocation is set out in pre-issuance documents, such as the green bond framework, a second-party opinion (SPO) or other documentation (e.g. bond prospectus).

To provide a representative picture of the sector, only green bond proceeds that have been allocated to low-carbon buildings have been taken into account. This means that reported figures are not representative of full green bond issuance amounts, but rather, of amounts specifically allocated to low-carbon buildings.

Sector overview

In the green bond market, low-carbon buildings have been financed by a wide range of entities. In the last few years, **ABS issuers** as well as **financial and non-financial corporates** have played a significant role in the sector contributing more than 65% of total proceeds allocated to low-carbon buildings. Development banks, central and local governments and government-backed entities are also active issuers. Most deals have financed housing and multifamily properties, but financing has also gone to commercial buildings (offices, logistics) and specialised buildings, namely hospitals, airport facilities, schools and universities.

The **green securitisation market** has gained particular significance with ABS issuance of USD40bn allocated to buildings. These deals aggregate pools of loans, leases or similar contractual receivables to a deal size big enough to justify the transaction costs of bond issuance. Fannie Mae and PACE-scheme issuers are responsible for a significant share of green ABS issuance, but there have been also green RMBS and green CMBS bonds (see p3).

Suitable projects for low carbon building green bonds include new construction and the refurbishment of existing properties. New buildings need to meet energy efficiency targets and/or obtain a recognised building certification. Products such as LED lighting, technologies such as district heating, equipment meeting industry certification schemes may be suitable for green bond issuance if they target energy performance improvements of at

least 20%. Certain building materials such as FSC certified wood building materials could also qualify.

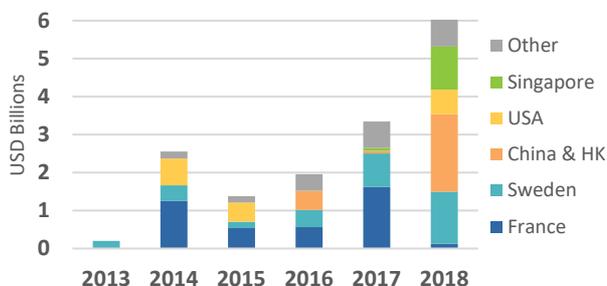
In addition to energy efficiency upgrades, Fannie Mae’s Green Rewards, Property Assessed Clean Energy (PACE) and some other programs, also target improvements in water use and efficiency.

Property companies started issuing in 2013

Vasakronan (Sweden) was the first non-financial corporate and first property company to enter the green bond market. Since 2013, it has issued 15 green bonds with a total of USD2.3bn allocated to low-carbon buildings.

SFF (Svensk FastighetsFinansiering) entered the green bond market in 2015. The financing vehicle is a JV for 5 listed property companies, and has raised USD747m in multiple bonds to finance their investments across Sweden. Proceeds are allocated fully to finance commercial low-carbon buildings, mainly offices, that have achieved at least LEED “Gold” or BREEAM “Very Good”.

Property companies across the world have issued green bonds



Note: 'Other' includes (in descending order of total issuance) Luxembourg, South Korea, Australia, Japan, Canada, Germany, Malaysia, South Africa, the Netherlands, Belgium and Norway

In total, USD15.5bn have been raised by property companies to fund green buildings and upgrades in 16 countries. Issuers from Sweden and France top the rankings, but 2018 volumes feature strong issuance from Singapore and Hong Kong companies.

Dutch property company **OVG** raised EUR80m in 2016 to finance the redevelopment of existing commercial properties into four sustainable office buildings. The loan was Certified under the Climate Bonds Standard for Low Carbon Buildings (Upgrades).

In 2018, global logistics real estate fund manager **Prologis** issued USD763m, a first for logistics. Building certification under LEED, BREEAM, HQE, DBJ or similar is required for assets to qualify.

In Australia, the **Monash University** has issued three Certified Climate Bonds for a total of AUD400m, with proceeds allocated to new low-carbon buildings, energy efficiency upgrades and solar generation for facilities on the university campus. The projects result in 42% saving in emission intensity per square meters, which is in line with the CBI buildings criteria.

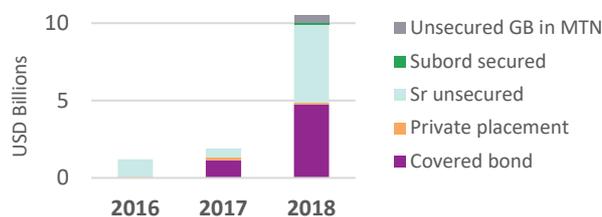
Banks step up green property financing

2018 has seen increased issuance from banks with property lending operations and total buildings-related issuance reached USD24.2bn. This is largely due to a rise in green covered bond issuance as Norwegian mortgage lenders entered the market.

Berlin Hyp (the first green Pfandbrief issuer), **Deutsche Hypo** and **DNB Boligkreditt** account for c.70% of mortgage covered bond volume. DNB Boligkreditt, the mortgage arm of Norway’s largest

financial services group, debuted with a EUR1.5bn Certified Climate Bond; **SpareBank 1 Boligkreditt** with a EUR1bn Certified Climate Bond. Both cover pools comprise residential assets, which comply with the 2010 and 2017 Norwegian building codes.

Covered bonds have boosted bank issuance



German mortgage bank **MünchenerHyp** issued its first EUR500m green Pfandbrief in 2018 to finance residential and commercial mortgages. **Barclays** was the first financial institution in the UK to issue a Certified Climate Bond financing residential mortgages for properties scoring in the top 15% in the EPC rating system.

Covered bonds provide a funding option for banks and real asset security to investors

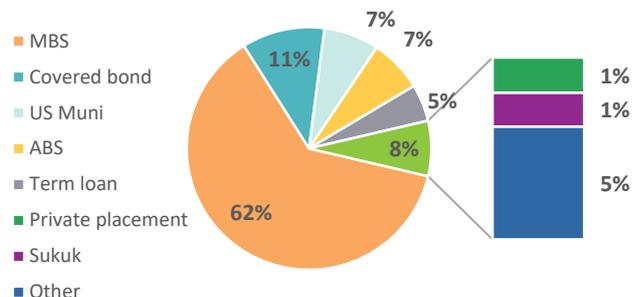
Covered bonds are highly-regulated securities in Europe with superior credit rating. They achieve lower funding cost unsecured debt thanks to a dual recourse structure where bond investors have a general claim against the issuer, as well as a claim over a dedicated ‘cover’ pool of assets. Cover pool composition is regularly monitored, which benefits investors.

In May 2018 Landshypotek Bank (Sweden) issued the first forestry covered bond. The cover pool eligibility criteria feature PEFC and FSC certification for large holdings and green forest management plans for small holdings.

Green bonds finance a wide range of low-carbon public infrastructure

Local and central governments play a key role in financing low-carbon buildings, as they often have the statutory duty to provide public infrastructure. Central and local governments have allocated USD11.8bn to buildings (or 18% of their green bond issuance). Universities, schools and hospitals are prominent examples of public buildings funded with green bonds.

Mortgage-backed securities constitute the highest share of building green bonds



The Swiss **Canton of Geneva**, for instance, issued a CHF620m (USD610m) green bond in late 2017 to finance the new University Hospital building, the extension of the maternity hospital and University of Geneva’s “CMU” new building, all developed following energy high performance standards (HPS).

Zürcher Kantonalbank, on the other hand, issued CHF325m to finance mortgages and real estate loans as well as housing cooperatives. Both Swiss transactions require properties to be certified under the MINERGIE certification scheme.

In Sweden, state-owned company **Specialfastigheter** has issued a SEK1.25bn (USD150m) green bond to finance properties related to the prison and probation service, defence and judicial system, institutional care and other special operations. Buildings have to be certified at Miljöbyggnad Gold or Silver level to qualify.

Over USD5bn have been allocated to buildings by US local governments and agency issuers. For example, eight US state universities have used US Muni green bonds to fund upgrades to campus buildings, as have some school districts.

The **New York State Housing Finance Agency (HFA)** has issued USD812m in 10 Certified Climate Bonds to fund affordable housing with low-carbon impact across New York State. Eligible projects are compliant with the Climate Bonds Standards for low-carbon buildings, and meet local building codes such as the NYC Local Law 84, or the ENERGY STAR energy rating scheme for multifamily residential infrastructure.

California Health Facility Financing Authority (Kaiser Foundation Hospitals) has issued USD983m in two green bonds to finance medical facilities that have received or are expected to receive LEED gold or platinum certification.

US local governments have also issued green bonds for buildings.

Denver City & County Board of Water Commissioners issued USD143m for the redevelopment of Denver Water's main operating and administrative complex, for example. The new buildings are expected to be LEED certified.

Most sovereign green bonds have earmarked proceeds to fund low-carbon buildings: over USD6.3bn from Ireland's **National Treasury Management Agency**, the **Republic of France** and the **Republic of Indonesia**. In 2018, the **Republic of Lithuania** issued a EUR20m sovereign green bond solely to finance a loan to the Public Investment Development Agency to fund the renovation and energy efficiency improvements in 156 apartment buildings.

The green securitisation market

ABS issuance accounts for a third of green bond issuance for low-carbon buildings. A securitisation can be defined as 'green' when the underlying cash flows are related to low-carbon assets or the proceeds are used to finance such assets. However, ABS are complex bond structures which require specialist structuring expertise and an ABS investor base. Consequently, most deals to date are from more sophisticated bond markets.

Fannie Mae's Agency MBS and US PACE ABS are prominent examples, but issuance also includes green RMBS from the Netherlands and Australia, and CMBS in China and the USA. Although not included under buildings, there have also been US and Australian ABS deals secured on residential rooftop solar.

US government agency **Fannie Mae** does not provide green loans itself. Rather, it supports the secondary residential mortgage market in the US by purchasing pools of mortgages, which it aggregates and uses as collateral in green MBS, which it sells to investors. It has issued USD47bn to refinance mortgages secured on buildings with a green building certification or improvements to reduce energy and/or water consumption by at least 25%.

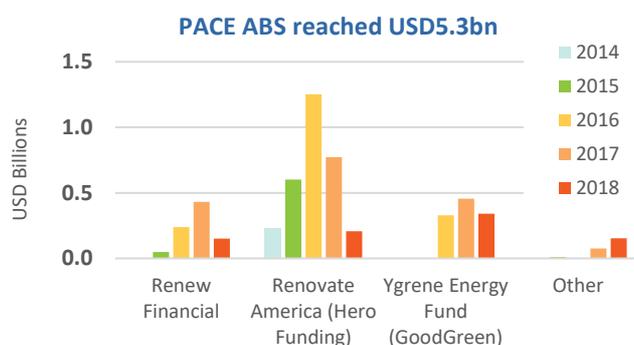
Diversity of mortgage-backed structures

Agency MBS are issued by US government agencies, primarily Fannie Mae and Freddie Mac. They purchase a significant volume of mortgage portfolios from originating lenders and refinance them in the MBS market. Green initiatives send a strong signal to lenders, particularly when they incentivising best practice such as certification for buildings and lending for energy efficiency. Both Fannie Mae and Freddie Mac offer preferential terms to "green" multifamily mortgage pools.

Residential mortgage-backed securities (RMBS) are secured on large pools of residential mortgages. Dutch lender Obvion issued the first green RMBS in 2016 and has now issued three Green Storm RMBS deals totalling USD1.9bn. In 2018, National Australia Bank issued an AUD2bn RMBS with an AUD300m green tranche. All have been Certified against the Climate Bonds Standard for Low-Carbon Buildings.

A common barrier to scaling up green RMBS is the lack of data or access to energy performance data. In the UK, for example, pressure from lenders to make data publicly available has resulted in new green bond transactions.

Commercial mortgage-backed securities (CMBS) deals secured on commercial mortgages. Property types include office, shopping centres, multi-family housing, logistics, etc. CSAIL, a joint platform of Credit Suisse and Natixis, issued the first CMBS deal with green subordinated notes. They are secured on a LEED Platinum certified office building on Wall Street in New York City. However, it is China that recorded the first green CMBS – a three tranche deal secured on a LEED Gold Certified office building owned by China Energy Conservation and Environmental Protection Group (CECEP).



PACE – Property Assessed Clean Energy – is a US programme, aimed at improving energy and water efficiency in residential and commercial properties. Typical PACE projects include instalment of heating and cooling systems, lighting improvements, solar panels, water pumps, insulation, etc.

PACE lenders provide loans, and some refinance their loans via green bonds. California is at the forefront of PACE ABS issuance, with most PACE lenders issuing bonds. Renovate America is the first and largest PACE ABS issuer. PACE ABS issuance amounts to USD5.3bn with a number of established capital providers responsible for setting-up and financing PACE programmes.

Additionally, around USD3.8bn of solar ABS bonds have been issued to finance the installation of residential solar systems. Prominent issuers are Tesla Energy, Vivint Solar and Solar Mosaic.

As part of the H2020 project, the European Commission is funding the EuroPACE project which seeks to introduce PACE in Europe. The Climate Bonds Initiative is part of the Consortium working on EuroPACE as green bonds represent an effective financial tool to capitalise the programme.

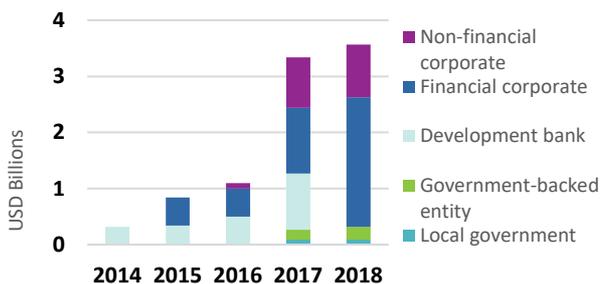
Opportunities in Japan

Japan has a long tradition of expertise in energy efficiency and technological innovation. Since the explosion of the Fukushima nuclear reactor in 2011, Japan energy efficiency measures have become increasingly important in meeting energy demands and Japan's pledge to reduce CO₂ emissions.

Japan has witnessed a property construction boom with 24.1m new dwellings being built between 1991 and 2013. The Japan Sustainable Building Database provides a list of best practice examples of low-carbon buildings, including technical details and a CASBEE score, which reflects the environmental performance of the building as evaluated by the CASBEE rating system.

New energy efficient buildings and building upgrades could be funded with green bonds. However, the green bond market in Japan is still fairly small at USD9.2bn of issuance to the end of November 2018. Proceeds allocated to low-carbon buildings represent about a third of total issuance, or around USD3bn.

Banks dominate Japanese green bond issuance in 2018

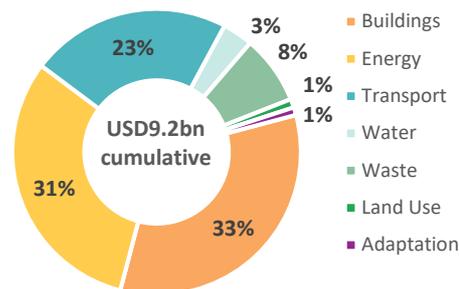


Development Bank of Japan is the biggest issuer in the sector, having allocated almost USD2.2bn under four green bonds to finance loans for the construction of buildings, which received a DBJ Green Building Certification of at least 3 stars out of 5.

Mitsubishi UFG, Sumitomo Mitsui Banking Corporation and **Sumitomo Mitsui Trust Bank** are the top three financial corporates. Between them, they have allocated USD706m to low-carbon buildings and building energy efficiency.

Tokyo Metropolitan Government has issued two green bonds and allocated USD36m (or 35% of issuance) to finance smart energy, urban development and improvement of the living environment. Additionally, around 30% of proceeds have been allocated to climate adaptation projects such as the development of tsunami protection facilities, development of Tokyo port facilities and islands coastal protection facilities and development of medium and small size rivers.

A third of green bond proceeds raised by Japanese issuers go to low-carbon buildings



Airline company **Ana Holdings** and the **Nomura Research Centre** have raised bonds specifically to finance buildings. Ana Holdings allocated the proceeds to the construction of a new energy efficient training centre designed to achieve a 33% Energy Reduction Ratio under the Tokyo Metropolitan Government's Green Building Program, corresponding to a Rank 3 (the highest of three levels). The Nomura Research Institute, on the other hand, financed the acquisition, construction and fit out of Yokohama Nomura Building in Yokohama business area.

Conclusions and outlook

In recent years, bond structure diversification in the green bond market has shown that capital markets can be accessed to finance energy efficiency and buildings projects. Japan being at the forefront of energy efficient technological innovation as well as low-carbon buildings construction, has the potential to leverage green bonds to finance the buildings sector.

Additionally, green bonds offer opportunities to finance climate adaptation projects. For instance, **Louisiana Local Government Facilities and Community Development Authority** issued a USD12bn to finance coastal restoration and protection through the placement of granite rock barriers along the coast to reduce shoreline retreat and promote natural vegetative colonisation.

Climate change poses threats and risks in Japan, where the Great Earthquake of 2011 had catastrophic impact. Strong action is required to address these risks, and investments in climate adaptation and resilience can be funded with green bonds. The Tokyo Metropolitan Government is the first Japanese issuer to allocate green bond proceeds towards climate adaptation, but ultimately all buildings need to become resilient.

Financial innovation is happening all the time in green finance. The new FTSE EPRA NAREIT Green Indexes, launched in December 2018, include Japanese property companies and allow investors to include sustainability in financial considerations for property companies and factor in different industry building certification schemes. Japan's strong commitment to sustainability could feed into investors' increased appetite for green investments, and green properties.