Refinancing EuroPACE loans in the European Fixed Income Market

Originally: Standardisation protocols for On-Tax Financing

Version: 1

Due: 20th January 2020

Completed: 17th January 2020

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785057.

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Deliverable Description

Task 2.3: Standardisation protocols for On-Tax Financing

Using as benchmark the ABS (Asset Backed Securities) Green Bonds issued in US PACE programs, this task will focus on EU regulation and standards (STS-Simple, Transparent & Standardised) to draft the EuroPACE securitisation protocols to aggregate and re-finance the EuroPACE financing pool.

Background

Task 2.3 was originally designed to provide standardised securitisation protocols for a EuroPACE programme. The aim of task 2.3 stems from the initial objective of exporting the US PACE model to Europe. The Property Assessed Clean Energy (PACE) program, which is overseen by the US Department of Energy, allows local and state governments, as well as inter-jurisdictional authorities authorised by state law, to provide funding for the cost of energy improvements (such as energy efficiency upgrades or the installation of renewable energy systems) and water conservation measures on qualifying residential and commercial properties. The loans have historically been refinanced via the issuance of **asset-backed securities** (ABS) secured on the loan receivables. To date, USD5.7bn of PACE bonds have been issued, including commercial and residential renovation programmes.

ABS are deals which aggregate a pool of loans, leases, or similar contractual receivables to a deal size big enough to justify the transaction costs of a bond. The process of creating ABS is known as **securitisation**. US lenders have a preference for securitisation of originated debt as it allows them to operate with smaller balance sheets than their European counterparts. Warehouse structures are commonly used to aggregate loans and this approach has been adopted in the US PACE model.

The successful issuance of ABS bonds to finance PACE loans in the US, but more substantially in the state of California, has been enhanced by favourable market conditions for ABS issuance together with the “on-tax” financing structure, and the relative ease at which the PACE enabling legislation can be adopted across states. To date, 27 US States are “PACE-enabled”(PACENation, 2019).

The European context, however, differs considerably from that in the US, both with respect to property financing models across European jurisdictions and securitisation. In the aftermath of the global financial crisis, there has been political and economic uncertainty, and the European securitisation market is still adapting to new regulations designed to create a secure and stable market, to central bank actions and the supposed ending of quantitative easing (DBRS, 2019).

In addition, unlike US lenders, European banks have a greater appetite for on-balance sheet exposure to property financing, which has led to the development of “green” mortgages and similar energy efficiency lending products in recent years. One reason is the robust nature of the covered bond market in certain EU jurisdictions, most prominently Germany and Austria: covered bonds allow mortgage lenders to fund their operations at very favourable terms and green covered bonds have been used to fund mortgages on energy efficient buildings. Synthetic securitisations have been used by European banks to transfer risk associated with mortgage portfolios. In the aftermath of the global financial crisis, central bank funding has been available from the ECB through its asset purchase programs, including the asset backed securities purchase program, although some of them have now been phased out (European Central Bank, 2020).

Further, the applicability of the "on-tax" financing structure is dependent on a variety of different jurisdictional rules and statutory authorities across different countries in Europe, which complicates adoption of such structure across countries, or at different tiers of government level.

New regulation has been introduced in Europe governing asset backed securities to remedy the collapse in confidence of the ABS market after the economic crisis: a framework for **simple, transparent and standardised (STS)** securitisation as part of the Securitisation Prudential Regulation (SPR). The STS framework sets out the conditions under which certain institutional investors might obtain more favourable regulatory capital treatment for STS securitisation exposures. Regulation supporting the STS framework applies to securitisation transactions completed after the beginning of January 2019. A potential area of application is residential mortgage backed securities (RMBS). For example, Obvion, a Dutch mortgage lender, which refinances its operations through its Storm RMBS program, has now issued three green RMBS and is also the first RMBS program to obtain STS verification (DBRS, 2019). RMBS is particularly suited as there is historical data on mortgage performance and RMBS: a key requirement for STS capital treatment is the availability of such data in order to ensure transparency and enhance standardisation (Norton Rose Fullbright, 2019). Only the most senior tranches (with no prior ranking claims) are eligible for STS treatment.

All in all, the differences between the European and US context in terms of market, regulatory and jurisdictional conditions mean that ABS securitisation is neither the only, nor the most likely solution for the refinancing of EuroPACE loans. Further research conducted by the Climate Bonds Initiative (CBI) shows that delivering securitisation protocols applicable to Europe is not feasible for a number of reasons:

- different property, consumer lending and security enforcement legislation in different jurisdictions, which requires differentiation of solutions by jurisdiction;
- much lower level of adoption of securitisation as a refinancing approach in Europe and an investment product given higher capital requirement than some other bond products; and
- the unlikely eligibility of EuroPACE loans for STS treatment (which would provide better capital treatment) at such early stage when there is no historical performance information. This may continue to be an issue if the loans do not rank senior to all other claims – to the best of our knowledge, one of the options being considered is for these loans to be secured but rank junior to mortgages which would make them ineligible for STS treatment.

It is also possible that energy efficiency loan under different EuroPACE country programs would not be secured on the property – instead they would be unsecured consumer lending. This puts the claims behind any secured claims, such as mortgages, and would require a different approach to refinancing in the bond market, which is more akin to consumer loan ABS receivables deals.

As a result of several discussions which took place over six-month period between the CBI and GNE Finance, a member of the EuroPACE Consortium, task 2.3 has been redefined to provide a more effective contribution to the EuroPACE programme implementation in its post pilot phase. A deadline extension has also been granted as a result of the lengthy period of time required to redefine the scope of task 2.3, as well as redirecting resources from task 2.3 to task 2.4.

Findings supporting the necessity of redefining task 2.3 are presented here and followed by the new set of deliverables for task 2.3.

Findings

Research conducted by CBI has shown that **ABS securitisation using the same model is, unfortunately, not possible across Europe**. While residential mortgages can qualify for STS treatment, residential energy efficiency loans are a new product with untested credit features so are unlikely to qualify for some time, at least until there is standardisation and historical data to ensure transparency.

Instead of using a standardised ABS across Europe to finance the energy efficiency loan, **more localised solutions are needed**. There is considerable heterogeneity between member states in the way home loans are financed/refinanced because of different legal framework around mortgages, other home improvement loans and different market norms. Mortgage lenders in Germany, for instance, would typically refinance through the well-established Pfandbrief (covered bond) market, while in the Netherlands and the UK, RMBS deals are typically used. There are also different provision enforcement, debt collection, and liens in different jurisdictions, and there are often multiple regimes within jurisdictions which apply to consumer lending, mortgages, liens, etc.

Further, unsecured loans, e.g. for energy efficiency improvements but consumer lending in general, tend to be small and heterogenous as they are taken out to finance a variety of consumer needs. Mortgage loans, are still small by bond market standards, but tend to be somewhat more homogenous within jurisdictions and by mortgage lender, which makes them easier to aggregate.

The **ability to use an on-property tax mechanism to collect loan repayments is only available in some jurisdictions**. However, it might still be possible for local governments to collect the loan payments, outside of the property tax mechanisms, and enforce non-collection on loan delinquency. This could potentially reduce the risk of large loan write-downs, and, if collected with other government charges, may improve recoverability levels.

Based on US experience, it is likely that **the loan will have to be repaid before the transfer/sale of the property**, rather than encumbering the property with a loan at transfer (which is the intention in on-tax lending, i.e. connecting the loan to the property and not the property owner/borrower). This outcome could be prevalent in the US for properties associated with a PACE loan. Fannie Mae and Freddie Mac, the largest purchasers of residential mortgages in the USA, require this to refinance mortgage lenders' portfolios. In fact, they offer the option to refinance the PACE loan as part of the refinancing package to ensure that there are no prior ranking claims to the mortgage they are purchasing (Fannie Mae, 2019a).

Making the energy efficiency loan senior to the mortgage is likely to attract fierce opposition from existing mortgage providers, could prompt mortgage lenders to increase their mortgage rates to compensate them for the additional risk they are taking on, and both may ultimately reduce uptake of the loan product in Europe. GNE Finance has considered making the loan junior to the mortgage, which could have resulted have slightly decreased the cost of finance. Recent developments in the EuroPACE business model- which were lately applied to the pilot in Olot (Spain) – however, propose a revised approach to debt collection, moving away from "on-tax financing", and hence preventing potential issues related to debt seniority.

In order to evaluate whether buildings being renovated as part of the EuroPACE programme would qualify for refinancing in the green bond market, **research on the most commonly used set of "green credentials"** has also

been conducted. A review of benchmark definitions for green buildings such as the Buildings Criteria of the Climate Bonds Standard[1], the Climate Bonds Taxonomy[2] and the Climate Bonds Methodology[3] have also been presented and discussed in the context of the EuroPACE programme.

Finally, preliminary findings from the EU Taxonomy consultation paper released by the EU Technical Expert Group (TEG) in December 2018 with respect to the buildings sector has also been considered (EU Technical Expert Group, 2019). The latter has been evaluated in view of EuroPACE gaining traction and scaling-up across Europe, and hence requiring a set of uniform definitions to target buildings eligible for renovation.

These findings have come up as a result of both research and discussions with other EuroPACE Consortium partners in a timeframe spanning the beginning of the project to the end of August 2019. Results and considerations are presented below.

Results and conclusions

Based on conducted research, the overall effect is that **it will be difficult to aggregate loans across countries or produce a standard solution**. Rather, it would be more effective to develop a high-level approach and principles, while tailored financing solutions at a country level -perhaps subnational- can be identified at a later stage.

It may also be opportune to use different holding vehicles (e.g. fund) or different solutions to refinancing depending on market conditions (e.g. secured loan, warehouse facility, ABS) or tailor the refinancing solution to capital treatment for cornerstone investors (e.g. covered bonds v ABS v loan). In general, **refinancing solutions might need to be chosen dynamically** (i.e. according to country-specific market conditions).

Redefined task 2.3

The research conducted, related findings and conclusions clearly show the unfeasibility of delivering task 2.3, which has called for a redefinition of the task itself on the grounds that it will still provide relevant insights for the development of the programme. Below are presented final outcomes of several discussions which took place internally and with other EuroPACE Consortium members, but more specifically with GNE Finance, which granted approval to the revised deliverable for task 2.3.

Task 2.3 will therefore deliver:

1. Market analysis of green bonds used to finance energy efficiency in residential building markets worldwide
    - As part of the green bond market analysis of debt structures used to date, CBI will consider the pros and cons of the approach and what features can be deployed in other structures
2. Market analysis of selected number of debt structures – covered bonds and residential mortgage-backed securities (RMBS)- which can be used to finance energy efficiency in residential building markets in four countries pre-selected by the Consortium: Spain, Portugal, Belgium and the Netherlands
    - As part of the review of typical debt structure used for residential property financing, CBI will seek to identify key features which might benefit refinancing of residential energy efficiency

[1] https://www.climatebonds.net/standard
[2] https://www.climatebonds.net/standard/taxonomy
[3] https://www.climatebonds.net/files/files/Climate-Bonds-Initiative_GreenBondMethodology_092018%281%29.pdf

programmes. This links to task 2.4, specifically "current market development" and possibly "analysis of potential residential market barriers"

3. Analysis of different types of debt structures that could be used for refinancing different sizes of an energy efficiency loan book
4. Lending principles for this type of products such as EuroPACE loans

Introduction

How is energy efficiency financed in residential property markets?

Financing energy efficiency upgrades in the buildings sector is essential to mitigate greenhouse gas (GHG) emissions and offer significant opportunities to meet the stringent 1.5 C emission pathways identified by the IPCC (IPCC, 2019). According to the World Green Building Council (WGBC), the buildings and building construction sectors are responsible for almost 40% of carbon dioxide (CO_2) emissions and for 36% of final energy consumption (WGBC, 2017). This calls for the need to implement large-scale energy efficiency and home renovation programmes to bring forward the substantial action needed to limit energy demand and CO_2 emissions.

To date, a large number of energy efficiency programmes have been launched and implemented in several European states and across the globe, with the financing landscape being dominated by bank loans, subsidies and grant programmes on national, regional and local level. Additionally, mortgages have been used to finance energy efficiency in buildings, especially in Europe and the US.

Unfortunately, the level of investment on improving the energy inefficiency of buildings is still inadequate, with EUR137bn identified as the current investment gap (smartEn, 2018). Public funding cannot - by itself – unlock the transition investment needs, which calls for mobilisation of private capital. While public funding can help lower the cost and risk of financing, private sector funding can be redirected to finance the transition and fill the investment gap.

Accessing the debt capital markets to finance home renovation programmes represents an attractive alternative. Structured finance – particularly securitisation and other structured notes – can provide a means to pool a large number of loans for residential retrofits and reach the scale needed to attract institutional investors. Historically, covered bonds have also been successfully employed for this purpose as well. The green bond market has also witnessed issuance of different bond structures (secured and unsecured) by banks, non-bank lenders, real estate investment trusts and property companies to finance low-carbon buildings. Funds have also been set up to finance this type of product.

This research seeks to provide an overview and market analysis of debt structures that could be used to finance and/or refinance energy efficiency loans for the EuroPACE programme once it scales up. This is presented in the context of four specific countries (Spain, Portugal, Belgium and the Netherlands) which have been selected by the Consortium as most likely to meet the conditions for implementation of EuroPACE.

The research looks specifically at **ABS securitisation**, **residential-mortgage securities** (RMBS) and **covered bonds** as financial tools which have historically been used to finance energy efficiency investment in residential property. Alternative **debt structures** are evaluated from case studies taken from the green bond market, which has witnessed a variety of different deal structures to finance energy efficiency in the buildings sector.

Concluding remarks will shed light on pros and cons of adopting a particular debt structure at a specific country level. Finally, universal lending principles for energy efficiency loans will be presented as good practice to create product standardisation which can be helpful in view of the expansion of EuroPACE across Europe.

Definitions of debt structures considered in the current research

Different debt structures can be used to finance energy efficiency. Here follows a high-level description of number of structures which are relevant for financing energy efficiency in residential property markets.

Securitisation enables companies and lenders to sell off existing financial assets to free up capacity for more business. It is the process through which an issuer creates financial instruments – **asset backed securities or ABS** – backed by financial assets such as mortgages or lease receivables. The ABS bonds are sold to investors who receive a return drawn from the cash flows of the underlying assets. By aggregating the funding into a common structure, securitisations enable institutional investors to finance small scale assets and small- and medium-size businesses. **RMBS** (Residential Mortgage-backed Securities) are ABS deals secured on large pools of residential mortgages.

A securitisation can be defined as ”**green**” when the underlying cash flows relate to low-carbon assets or where the proceeds from the deal are earmarked to invest in low-carbon assets such as loans or mortgages on certified buildings.

A **synthetic ABS** transfers the credit risk associated with a portfolio of loans to an external party. The originator retains the loans on balance sheet which allows the latter to increase risk capital capacity and originate new debt. Credit Agricole placed it’s synthetic ABS with US hedge fund Mariner Financial. Protfolio losses are absorbed from

ABS receivables can be used to secure an ABS deal as long as the revenue is predictable enough to be modelled and valued. Diversification is a key benefit for investors as it reduces the risk of losses from any one project or borrower. This makes pools of lease payments, small loans, bills and fee collections ideally suited. The structure can be employed both by financial institutions and corporates.

Covered bonds are highly regulated, and enjoy superior credit ratings and lower funding costs compared with unsecured debt issued by banks. This is achieved through a dual recourse structure where bond investors have a claim over dedicated ”cover pool” of assets, as well as a general claim against the issuer itself. Covered bond legislation defines strict conditions that the issuer must comply with to ensure that the quality of the cover pool collateral is maintained.

Secured bonds/loans are forms of debt which are collateralised over the underlying assets, in case of issuer’s defult. Secured bonds can also be secured with revenue streams from the project that the bond issue was used to finance.

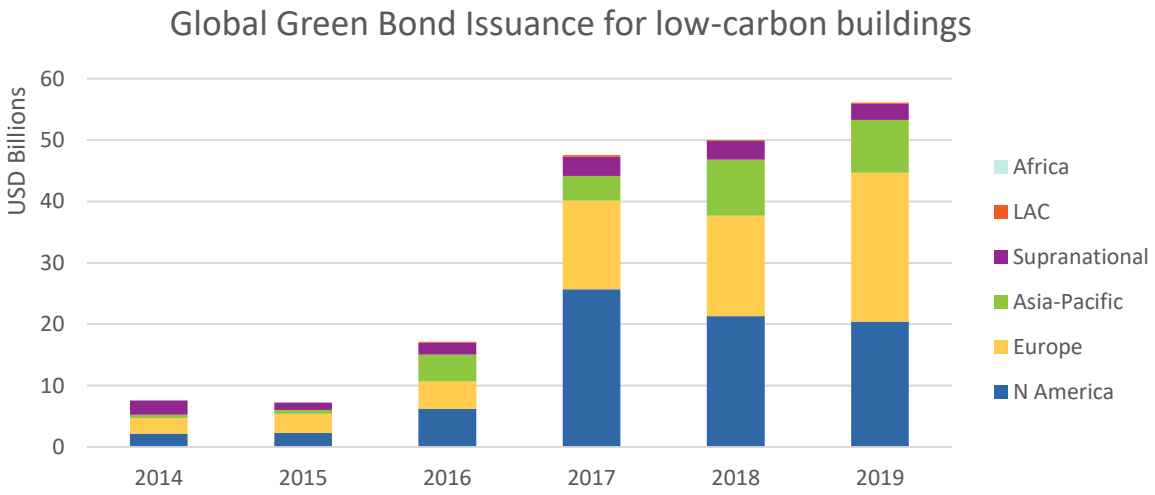
Medium term note (MTN) programmes create a debt issuance framework which gives the issuer the flexibility to come to market repeatedly to raise funding. The eligibility criteria are fixed, but bond terms are set for each bond issue.

Part I: Market Analysis

Overview: Financing low-carbon buildings in the fixed income market

The buildings sector has often been financed and/or refinanced in the capital markets. More recently, green bonds have offered significant opportunities to capitalise low-carbon buildings, i.e. buildings which have been identified as meeting a set of pre-defined standards encompassing energy efficiency, CO_2 emissions as well as other factors such as insulation. As shown in the chart below, North America and Europe represent the top two regions with allocated green bond proceeds towards low-carbon buildings, with 42% and 35% of the market share, respectively.

A variety of green bond structures have been earmarked towards low-carbon buildings[4]. In the **US** for instance, the PACE programme has been refinanced primarily via issuance of PACE ABS bonds, whereby each deal pools a large number of PACE loans. Fannie Mae, and more recently, Freddie Mac have issued green mortgage-backed securities: Fannie Mae's Green MBS constitute the largest share of green bonds financing buildings. Solar ABS bonds from Tesla Energy (former Solar City) and other issuers have also financed roof-top solar for both residential and commercial buildings.

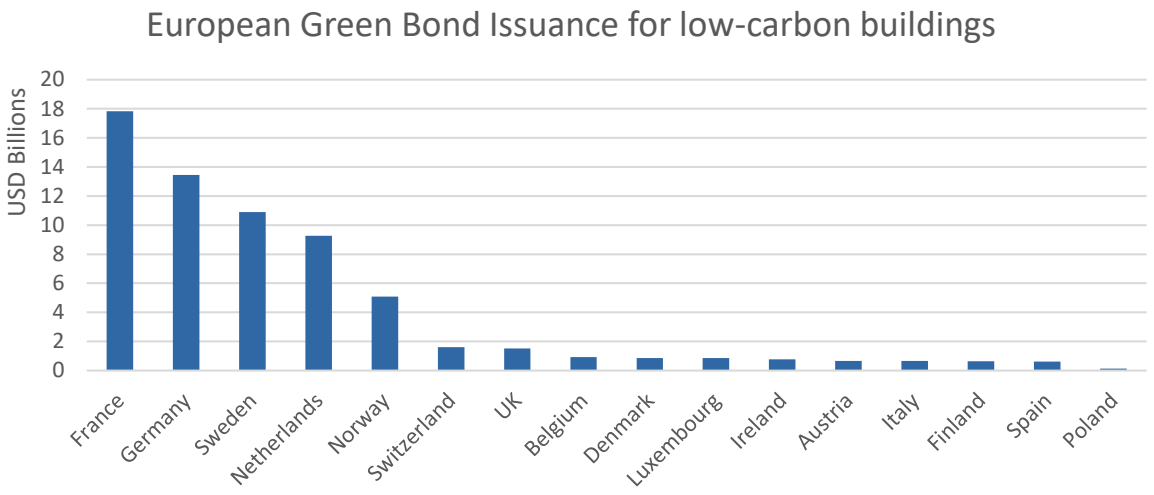


In the **Asia-Pacific region**, China, Japan and Australia have the largest green bond issuance for financing low-carbon buildings. In Australia, issuance has picked up significantly in 2019, with the highest share of proceeds earmarked towards low-carbon buildings. This is largely supported by strong green building certification schemes, particularly NABERS and Green Star. Additionally, the country has seen the green label encompassing a variety of green debt structures, such as RMBS deals from Pepper Group and the National RMBS Fund, ABS tranches from Flexi Group and green loans from Investa Commercial Property Fund.

In **Europe**, financial institutions and property companies have largely financed low-carbon buildings. France (USD17.8bn), Germany (USD13.5bn), Sweden (USD10.9bn), the Netherlands (USD9.3bn) and Norway (USD5.1bn) are the top five countries for green bond proceeds allocation for low-carbon buildings. Issuance in France is

[4] All data presented is per cut-off date, i.e. September 30th, 2019. Source: Climate Bonds Initiative (unless otherwise stated)

dominated by the sovereign while issuance from KfW and financial institution, such as Berlin Hyp and LBBW, prevail in Germany.



Structural bond diversity in the European green bond market

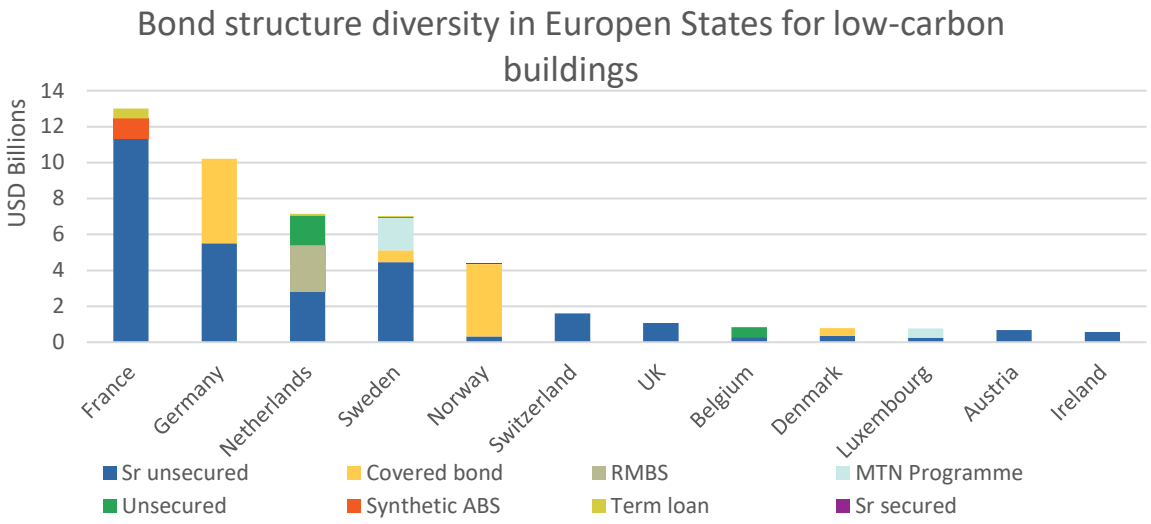
Senior unsecured green bonds are the most popular financial instrument used to finance and/or refinance low-carbon buildings in Europe. These have been issued in almost every European country where green bonds have been used for low-carbon buildings.

Covered bonds are very popular in Norway (where they dominate the market) Germany and Denmark. The Netherlands, on the other hand, has mainly seen issuance of green RMBS, with Obvion financing its Green Storm programme.

Sweden is the country originating the widest range of deal structures, with the presence of covered bonds, secured MTN, loans, senior secured and unsecured bonds. France has seen Credit Agricole coming to the market with a single synthetic ABS deal partially financing low-carbon buildings, a green loan from Ivanhoé Cambridge and Natixis Assurances and the senior unsecured sovereign green bond.

In Germany, the state-owned development bank KfW which has historically financed the buildings sector, is a recurring issuer in the green bond market. To date, KfW has issued almost USD1.6bn of senior unsecured green bonds earmarked towards low-carbon buildings. Property bank Berlin Hyp has issued covered green bonds.

Other European countries have not seen issuance of particularly diversified bond structures, with most of the green bonds being unsecured or part of a wider medium-term note (MTN) programme.



Country overviews - Europe

France ranks first in Europe with respect to green bond proceeds allocated to low-carbon buildings. Issuance is dominated by non-financial entities with the unsecured sovereign green bond accounting for almost 60% of total volumes, and utility company Engie's USD1.1bn green bond for almost 9%.

In 2017, Credit Agricole issued the only green synthetic ABS transaction to date. The USD3bn deal was earmarked for different sectors, with USD1.1bn allocated to low-carbon buildings. Credit Agricole is a recurring green bond issuer, having raised a total of USD6.5bn from 106 green bonds since their market debut in 2013.

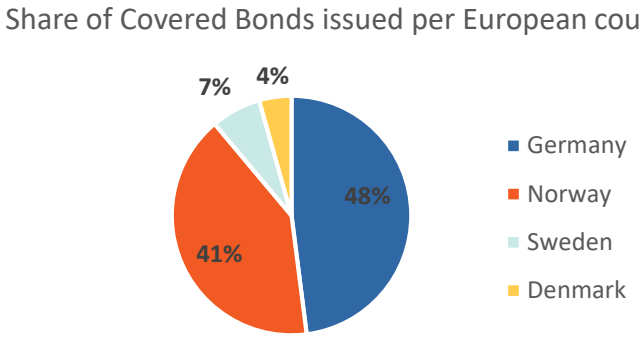
In the same year, real estate investment company Ivanhoé Cambridge and Natixis Assurances raised a commercial real estate loan worth USD558m (EUR480m) to finance the DUO Towers in Paris. The buildings have been designed to obtain high green certification standards: the project meets the Climate Bonds Standard requirements for certification as well as the BBC+ standard, the HQE Passeport (Exceptional) and the LEED Platinum Standard (Natixis, 2018).

In Germany, **Pfrandbriefe**, a type of covered bond issued by German mortgage banks, have been widely used to finance low carbon buildings in the country. These are dual-recourse bonds: payment of interest and repayment of capital is expected from the issuer (as with any unsecured corporate bond) but there is also a pool of mortgages (the cover pool) which can be used to make payments on the bonds if the issuer defaults. Pfrandbriefe are considered low-risk as, in case of issuer default, investors benefit from access to the cover pool for interest and repayment.

Berlin Hyp, Deutsche Hypo, LBBW and Munchener Hyp have issued green Pfrandbriefe, collectively raising USD4.7bn. Berlin Hyp was the first mortgage bank to issue a green Pfrandbriefe and remains the largest issuer in Germany. The bank launched its green bond programme in 2015 with the objective of 20% of its loan portfolio being earmarked as green by 2020. As part of the programme, the bank has issued four covered bonds which mainly refinance the acquisition, construction or refurbishment of green buildings. The loans and the mortgages associated with underlying commercial green buildings constitute the cover pools, which remain on the bank's balance sheet. However, Berlin Hyp has also raised corporate green bonds to finance its lending operations, with

three deals accounting for USD1.8bn (EUR1.5bn). Eligible categories for green buildings have become more stringent since the first green bond was issued. In 2016, an energy consumption limit (in terms of kWh/m*a) and "medium level" of industry certification schemes (e.g. LEED "Silver or above", BREEAM "Good or above") was set as the requirement for eligibility. In 2018, more sophisticated definitions, including differentiation between final and primary energy and heat consumption were set to identify threshold levels; in addition, top level industry certification schemes are now required, such as LEED "Gold or above" and BREAM "Very Good or above".

Deutsche Hypo, LBBW and Munchener Hyp have followed suit with issuance of green Pfrandbriefe financing and/or refinancing loans and mortgages for energy efficiency in residential or commercial buildings. KfW has also financed low-carbon buildings via issuance of senior unsecured green bonds, having raised USD3.8bn in the green bond market.



The **Netherlands**, on the other hand, has witnessed issuance of green RMBS from mortgage lender Obvion, a subsidiary of Rabobank. Obvion has originated mortgages for four Green Storm RMBS deals (USD2.6bn/EUR2.3bn), which benefit from the certification under the Climate Bonds Standard. Obvion's debut issuance in 2016 represents Europe's first 100% green RMBS, and targets the top 15% of residential buildings in terms of energy efficiency, or in alternative, a 30% energy efficiency improvement (Sustainalytics, 2019).

Obvion is also a lender of "regular" mortgages which are refinanced with the Storm RMBS programme. Obvion obtained an accreditation of STS treatment, which might offer opportunities for Green Storm deals to become eligible for STS treatment in the future, once more historical data and transparency can be provided to the market.

In the loan market, property developer OVG obtained a green loan from ABN Amro (EUR90m) to finance the **refurbishing** of four office buildings to make them more energy efficient. The loan also benefits from Certification under the Climate Bonds Standard (oekom, 2016). The loan matured in May 2019, but it represents good practice in terms of transparency as loan issuance does not come with the same degree of transparency.

Vesteda, the largest Dutch residential property investment fund, issued its inaugural green bond in May 2019: EUR500m (USD558m) as part of its EUR2.5bn MTN programme. Proceeds target **upgrades** for residential properties with an EPC rating of "A", or dwellings that have achieved at least a two-notch improvement in the EPC rating as a result of renovations , and reached at minimum of "C" rating (Vesteda, 2019).

Sweden has perhaps the most diversified green bond structures among European markets. Entities have come to the market with green covered bonds, secured green bonds and green loans.

The largest issuer is SFF (Svensk FastighetsFinansiering AB) which is a real estate financing company equally owned by five listed property companies. SFF has issued a total of USD811m worth of secured green MTN financing low-carbon buildings which conform to internationally recognised certification schemes. In addition, office space tenants are also responsible for signing a "green lease", an agreement with the landlord which sets an environmental agenda for the space (CICERO, 2018a). Fabege, one of the owners of SFF, was the first issuer globally to create a Green MTN programme in 2016. It has issued an additional USD1bn (SEK8.7bn) in its own name.

Swedish Covered Bond Corporation (SCBC), a subsidiary of state-owned SBAB bank, came to market with a covered bond (USD663m/SEK6bn) at the beginning of 2019. In addition, SBAB Bank, a state-owned mortgage and loan provider, has issued three senior unsecured green bonds, for a total of SEK6.7bn (USD776m). Finally, in 2019 the Swedish Property company Wallenstam AB has come to the market with two green loans, each raising SEK500m.

Norway entered the green bond market in 2018. The country witnessed issuance of green covered bonds financing green buildings for a total of USD4bn. DNB Boligkreditt AS, a subsidiary of DNB Bank is the largest issuer; the latter has issued two deals Certified Climate Bonds, for a total of USD2.8bn (DNB Boligkreditt, 2018). SpareBank 1 Boligkreditt has also issued a covered Certified Climate Bond (USD1.2bn/ EUR1bn) refinancing a pool of mortgage loans for energy efficient buildings. Finally, NorgesGruppen, a grocery wholesaling group, has allocated part of its green loan receivables (USD15m) to low carbon buildings.

Eligibility criteria in Norway are based on most recent constructed buildings' energy performance and their associated buildings codes (TEK 10 and TEK 17). This proxy has been created to evaluate properties' green eligibility as energy performance data is not publicly available. This method relies on very strict building regulation codes set in 2007, which guarantee that eligible buildings meet the top 15% low-carbon buildings in the local market. SpareBank Boligkreditt has also required a 30% minimum improvement for energy efficiency and top EPC ratings as alternative screening methods (DNV GL, 2018).

In the UK, Barclays was the first bank to issue a green senior unsecured bond (USD580m/EUR500m) to finance and/or refinance mortgages on energy efficient residential properties which represent the top 15% low-carbon buildings in terms of EPC ratings (Carbon Trust, 2017). These properties have been identified via a "green tagging" exercise based on the top EPC ratings for England and Wales.

Issuers from **Denmark** and **Poland** have also allocated proceeds towards low-carbon buildings, entering the market in 2019. Nykredit Realkredit, one of the largest lenders in Denmark, has issued a green covered bond (USD429/ SEK4.1bn) financing and/or refinancing green mortgages for buildings obtaining outstanding levels of green building certification schemes. Polish PKO Commercial Bank has also issued a green covered bond in order to finance and/or refinance a loan portfolio of mortgages for green residential buildings. The covered bond is worth PNL250m (USD66m) and has obtained Certification under the Climate Bonds Standard.

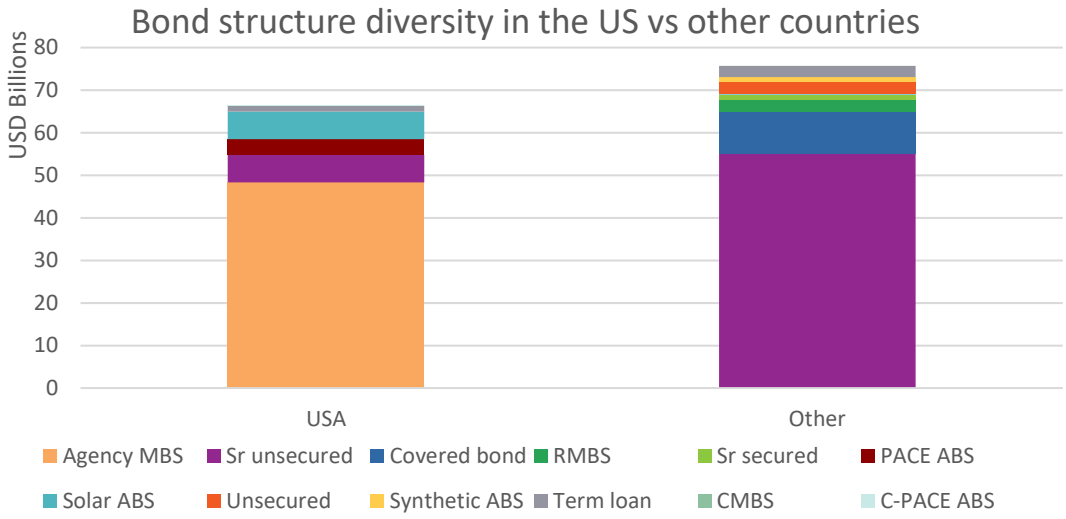
Financing low-carbon buildings globally: North America and Asia-Pacific

Green bonds have also been widely used to finance buildings around the world. The US accounts for almost half of proceeds allocated towards low carbon building worldwide. Issuance is dominated by Fannie Mae (Federal National Mortgage Association), which has issued just below USD50bn refinancing green mortgages.

Fannie Mae is a government-backed entity which provides market liquidity in the secondary market by purchasing qualifying mortgages from lenders. These are pooled together into MBS (mortgage-backed securities) bonds and then sold to investors with guarantees. In 2010, Fannie Mae launched its "Multifamily Green Financing Business" which targets buildings meeting a pre-defined standard of green credentials. The business offers two main type of products: the "Green Rewards" and the "Green Building Certification" (CICERO, 2018b). The former targets a range of renovations, retrofits and repairs that reduce energy or water consumption by **30%** (inclusive of at least a 15% energy consumption reduction) or more from a baseline performance on existing properties. The latter, targets properties which have been awarded a green building certification: there are 15 certification schemes which are recognised by Fannie Mae (Fannie Mae, 2019b).

Freddie Mac, a government sponsored enterprise, has recently issued a debut green bond (USD435m) as part of its "Green Advantage Programme". This is similar to Fannie Mae's green mortgages business as it also targets multifamily properties which meet at least 30% reduction of energy and water consumption, with a minimum of 15% coming from energy (Freddie Mac, 2019).

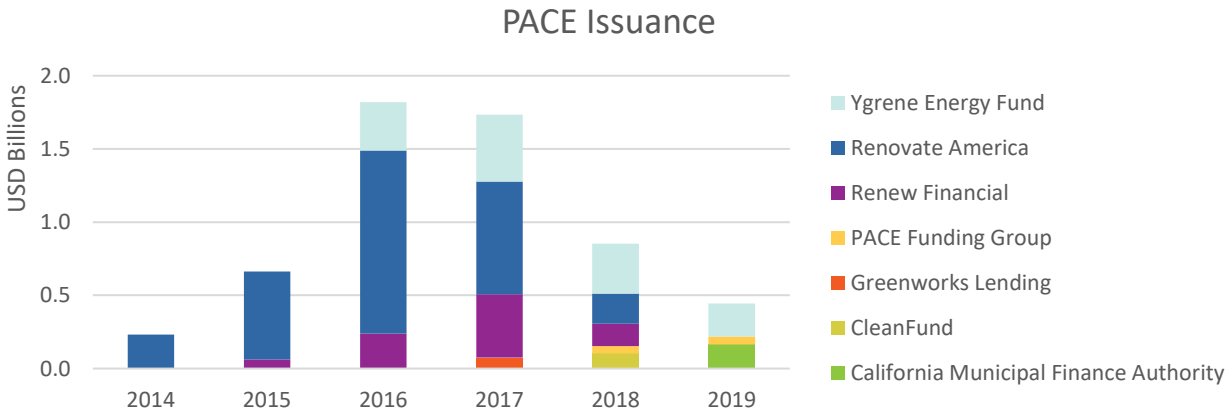
Solar ABS bonds have also been widely issued in the US. These are securitisations secured on cash flows from solar assets. Most deals are backed by lease payments and power purchase agreements. Some are backed by loans extended to fund the acquisition and installation of solar panels (Climate Bonds Initiative, 2018). Tesla Energy, former SolarCity, is the largest issuer of solar ABS bonds, with a cumulative volume of USD1.3bn. Solar Mosaic, a specialty finance company which focuses on originating consumer loans for the purchase of residential solar system, is the second largest issuer of solar ABS bonds with five deals accounting for USD1.2bn. The company operates as a financial platform to provide homeowners with loans to purchase residential only solar related systems connected to the grid (Sustainalytics, 2017). Other companies such as Vivint Solar (USD932m) and Dividend Finance (USD572m) have also issued solar ABS bonds based on a similar business model (Business Wire, 2017). A variation on solar ABS is Hannon Armstrong's ABS secured on ground lease receivables from solar and wind farms; these deal account for USD966m.



PACE (Property Assessed Clean Energy) **ABS** bonds have also been issued as part of the US PACE programme. PACE funds energy efficiency, renewable energy and water conservation improvements in both residential and commercial properties. The programme is based on an "on-tax" financing mechanism: loans are provided to consumers to finance energy improvements in buildings, which are then repaid through an addition to their property-tax. The programme is financed via issuance of PACE ABS bonds or via direct funding (U.S. Department of Energy, 2018).

The total PACE ABS bond issuance amounts to USD3.8bn, with residential PACE (R-PACE) accounting for USD3.7bn and commercial PACE (C-PACE) for the remaining USD97m. Including direct funding, the programme has raised a total of USD6.7bn (USD5.6 for R-PACE and USD1.1bn for C-PACE) (PACENation, 2018).

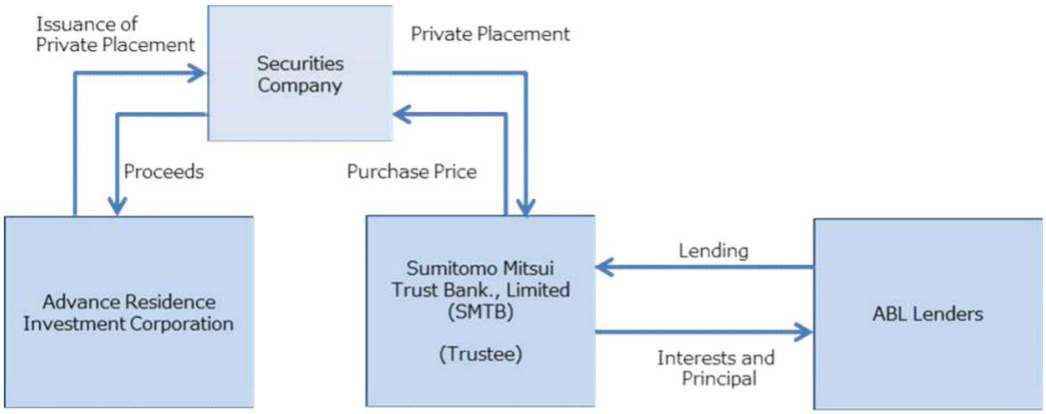
PACE's eligible assets for home renovation broadly constitute renewable and alternative energy products, such as installation of solar PV as well as energy and water efficiency products like highly efficient HVAC systems and indoor and/or outdoor water efficient systems. A more detailed list is provided in Annex I.



In the Asia-Pacific region, green bond issuance is dominated by China, where issuers have mainly come to the market with unsecured bonds financing low-carbon buildings. Green bond issuance from Japan and Australia has

been characterised by a certain degree of structural diversity: loans, RMBS, solar ABS, loan receivable ABS and secured bonds have all played a role in financing low-carbon buildings and energy efficiency. Data on Asia-Pacific region green bond structural diversity is available in Annex III.

In Japan, **Advance Residence Investment Corporation** issued a USD28m (JPY3bn) private placement which was entirely bought by **Sumitomo Mitsui Trust Bank** (SMTB). The private placement proceeds have been used to refinance the acquisition of an existing residential condominium, the RESIDIA TOWER Meguro-Fudomae, which was awarded with the **DBJ Green Building Four Stars** (2018) certification. SMTB has in turn bought the green private placement via issuance of green loans, which have been repaid on the basis of the principal and interest paid by Advance Residence Investment Corporation to SMBT. Japan Credit Rating Agency has evaluated Sumitomo Mitsui Trust Bank's loans and assigned them a "green 1" rate as the residential condominium meets eligibility criteria set by Advance Residence Investment Corporation as well as standards required under the Green Loan Principles. The chart below summarises the financial mechanism which continues the basis for green evaluation of the loans issued by SMTB (Japan Credit Rating Agency, Ltd, 2019a).

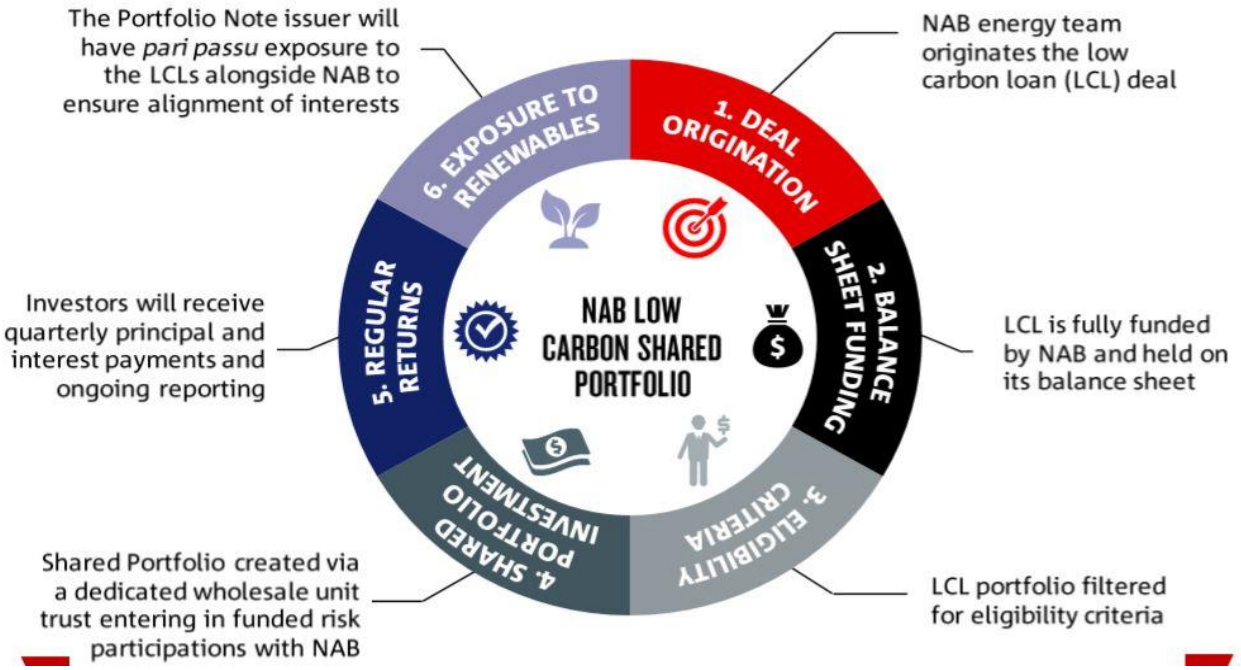


Solar ABS bonds have been solely issued by the financial corporate **AEON Product Finance** in Japan. The two solar ABS deals, which cumulatively account for JYP23.2bn (USD215m) have financed the loans to residential and corporate customers for the purpose of installing solar power generation systems, storage batteries and all related electric facilities. The loan receivables represent the underlying assets used to pay the principal amount and interests to investors (ICMA, 2019; Japan Credit Rating Agency, Ltd, 2019b).

Finally, green mortgages have been financed by **Japan Housing Finance Agency**. This is a government backed entity which supports the stable provision of fixed-rate housing loans to help improve the living standards of people in Japan(Nomura, 2019). Japan Housing Finance Agency's three senior secured green bonds are secured over a specific type of mortgage loan known as "Flat 35S". This type of mortgage finances only new build houses with high energy conservation measures and earthquake-resistant features, offering lower interest rates over a certain period of time (Japan Housing Finance Authority, n.d.).

In Australia, NAB represents one of the largest green bond issuers in the country, with USD233m allocated to low-carbon buildings. In addition to its senior unsecured green bonds, the bank has set up a vehicle which issue notes secured on the **NAB Low Carbon Shared Portfolio**; this was created with the intention of providing investors access to investments financing renewable energy (NAB, 2018). The financial vehicle holds 70-75% of a pool of loans originated by NAB to finance seven existing wind and large-scale solar farms. NAB retains and has committed to

hold the remaining portion of the loans to ensure alignment of interest with investors. The underlying assets are eligible projects under the Climate Bonds Standard Solar and Wind Criteria and were verified for inclusion in the NAB Climate Bond portfolio. The structure can be adapted to use for other asset financing. The picture below summarises the process underlying the set-up of the NAB Low Carbon Shared Portfolio.



FlexiGroup, an Australian and NZ consumer and SME leasing company, has also issued green ABS deals financing residential solar PV systems and other related equipment. The ABS deals are backed by loan receivables which had been initially originated by FlexiGroup's fully owned subsidiary, Certegy Ezi-Pay Pty. To date, FlexiGroup has come to the market with AUD272m (USD202m). All deals benefit from certification under the Climate Bonds Standard.

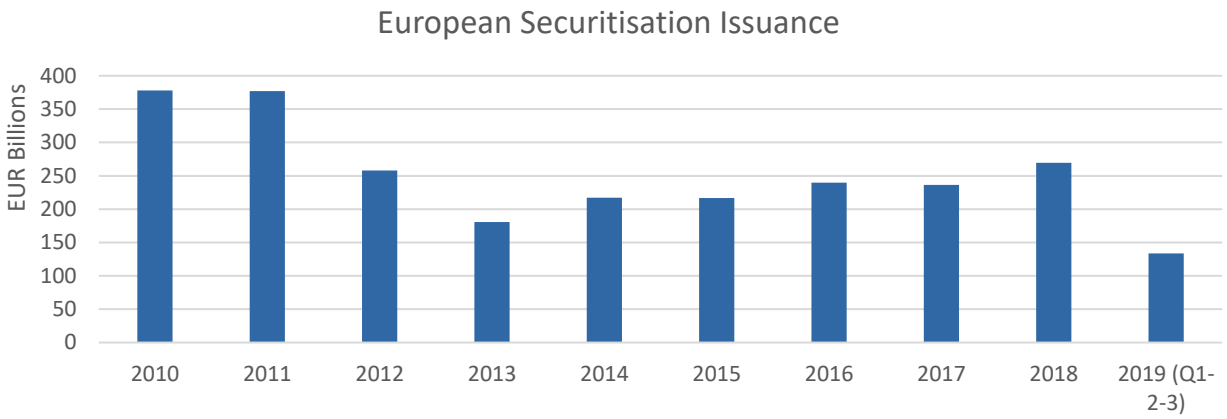
Finally, Macquarie Group has come to the market with a GBP2bn credit facility which includes two green tranches, each worth GBP250m. These have been earmarked for a range of sectors, including green buildings and renewable energy.

Refinancing alternatives for EuroPACE loans

The green bond market has shown that low-carbon buildings can be financed/refinanced via a number of different debt structures. Often, issuers choose the most suitable bond structure according to market conditions in a specific region or country, as well as their credit rating, which could affect investor appetite for a certain bond.

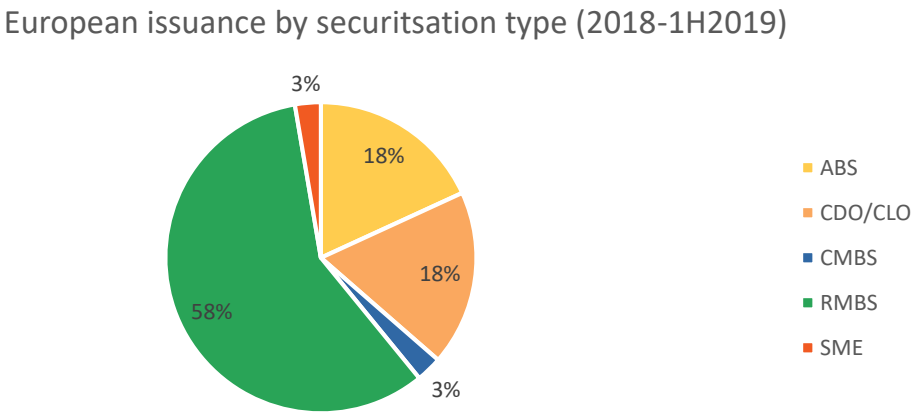
The EuroPACE programme is currently exploring refinancing options that would suit European markets, more specifically in four counties selected by the Consortium: Spain, Portugal, Belgium and the Netherlands. Given the nature of the loans being financed, i.e. renovation programmes and energy efficiency in residential buildings, securitisation, covered bonds and financial platforms are being considered.

Securitisation markets in Europe



Data source: "Securitisation Data Report - European Structured Finance Q2 2019", AFME[5]

In the aftermath of the global financial crisis (GFC), European securitisation issuance substantially decreased, with 2013 showing the lowest level in the past decade. Issuance has picked up since then, however, growth has slowed down in 2019 with respect to the stable increase witnessed over the past five years. This reflects the recent period of political instability, with markets still adapting to new regulations introduced to support more stable and secure securitisations markets.



Data source: "Securitisation Data Report - European Structured Finance Q2 2019", AFME[5]
***Glossary**: ABS (Asset-backed Securities), CDO/CLO (Collateralised Debt Obligation/Collateralised Loan Obligation), CMBS (Commercial Mortgage-backed Securities), RMBS (Residential Mortgage-backed Securities), SME (Small and medium-sized enterprises)*

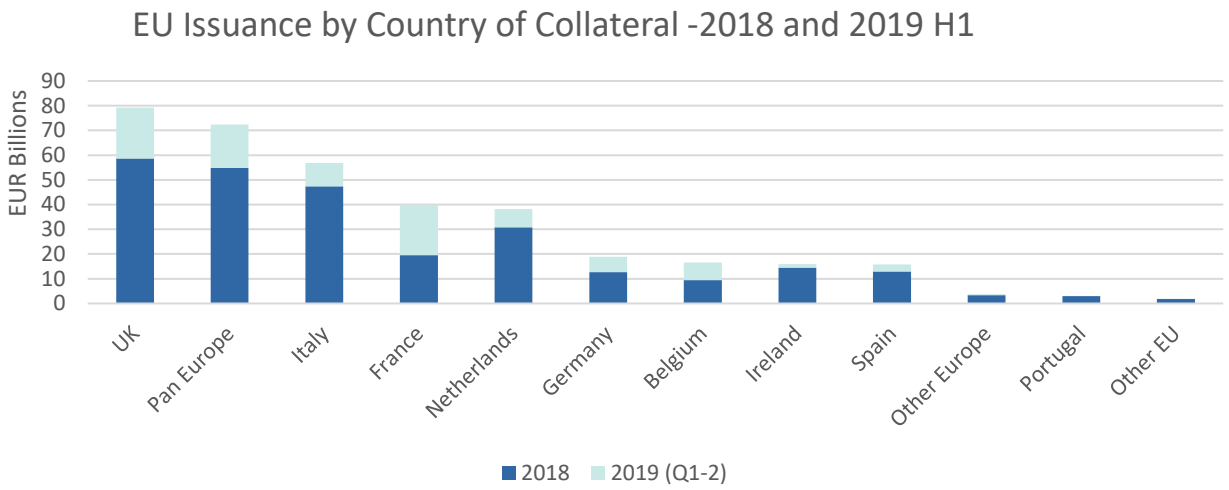
At the same time, bank balance sheets have strengthened as a result of prudential-regulatory measures introduced in the aftermath of the GFC so banks have been obliged to create balance sheet capacity for new lending. They also benefit from better developed covered bond markets, especially in Germany, Austria, Spain and

[5] https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME%20Securitisation%20Data%20Report%202Q%202019-3.pdf

the Nordics (see more on covered bonds below). Access to covered bond funding lowers the cost of lending making it an attractive and preferable alternative to securitisations, which attracts higher risk weighted capital.

In the US (data chart in Annex II), on the other hand, securitisation markets started to recover in 2012, and with the exception of 2014, markets have witnessed a fairly stable growth. On a general level, securitisations markets are more developed in the US as lenders have a preference to operate with smaller balance sheets which allows for reallocation of capital to other investments. Warehouse structures are commonly used to aggregate loans and securitise them, with this approach being adopted in the US PACE model.

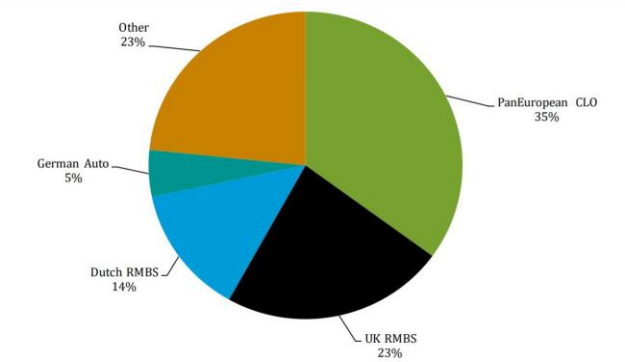
Over the last two years, securitisation in Europe has been dominated by issuance of RMBS, which accounts for almost 60% of total issuance volumes. ABS and CDO/CLO follow, each accounting for 18% of market share. Finally, CMBS and SME represent a small fraction, with a cumulative contribution of 6%.



Data source: "Securitisation Data Report - European Structured Finance Q2 2019", AFME[6]

The UK is the top European country generating securitisation issuance, accounting for EUR79.3bn in 2018 and the first half of 2019. Italian, French and Dutch issuance follow, with a larger share of issuance coming from 2018, which is representative of the general trend. France is the only country which has issued more securitisations in the first half of 2019 than in 2018. In comparison to other countries, Belgium and Germany have shown a higher proportion of issuance in H1 2019 compared to 2018.

[6] https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME%20Securitisation%20Data%20Report%202Q%202019-3.pdf



Data source: "Securitisation Data Report - European Structured Finance Q2 2019", AFME[7]

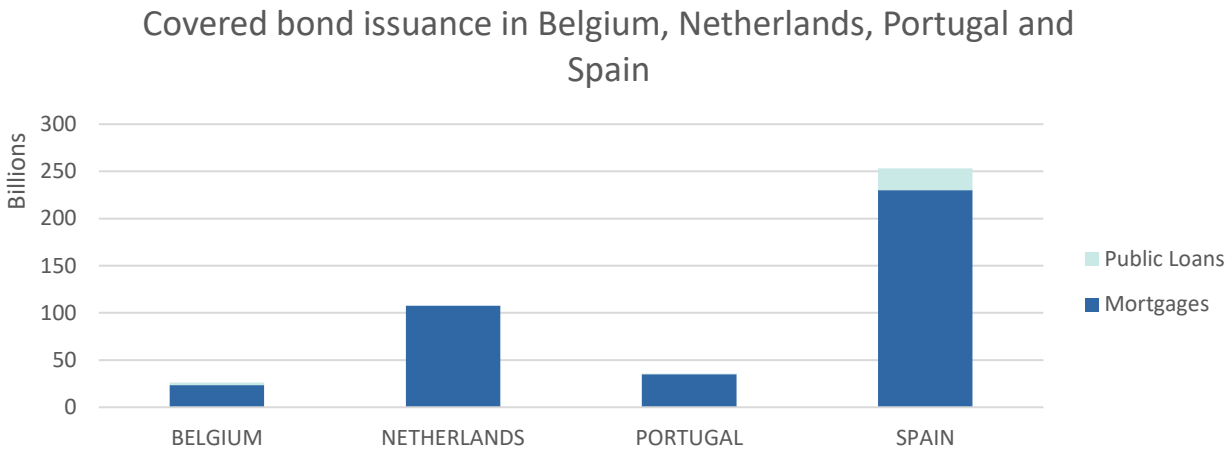
In Q2 2019, RMBS represented the largest share of European securitisations, with 37% of total volume. **UK RMBS** accounts for more than half the deals (23%), with the remaining share originated in the Netherlands. PanEuropean CLOs follow, with 35% of the total. Other types of securitisation account for 23% of the total, while German Auto ABS represents 5%.

UK and Dutch RMBS are the most relevant markets for residential property refinancing. They can be used both for mortgages on energy efficient housing (as in the Barclays green bond deal) and "green" mortgages which include upgrade measures to improve the performance of housing (as in ABN Amro green bond deals).

Covered bonds in Spain, Portugal, Belgium and the Netherlands

Covered bonds linked to ring-fenced cover pools of mortgages have been widely issued in Europe. Germany has the largest, oldest and most robust covered bond market. Amongst the four countries selected by the Consortium, Spain represents the top one for covered bonds issuance, with a total of EUR253.3bn. The Netherlands ranks second, with EUR107.6bn, while Portugal and Belgium account for EUR35.5bn and EUR26.3bn, respectively. All data is per cut-off date, i.e. September 30th, 2019.

[7] https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME%20Securitisation%20Data%20Report%202Q%202019-3.pdf



Data source: Bloomberg. Cut-off date: 30/09/2019

Almost 94% of covered bonds issued in the four countries benefit from mortgage cover pools. The remaining 6% are linked to public loan cover pools. These have been issued mainly in Spain, where they account for just below 10% of the total (EUR22bn). Public loans' proceeds allocation is not transparent, i.e. it is unknown whether these are earmarked for the buildings sector. Generally, public loans finance a range public infrastructure projects related to different sectors, e.g. waste or water. Analysis of such loans goes beyond the scope of this research as they are not directly related to financing of the residential property sector.

Covered bonds benefit from high ratings and low funding costs which makes them attractive to mortgage lenders.

Part II: Considerations

Suitable options for refinancing EuroPACE loans

Examples from the green bond market suggest that buildings can be financed and/or refinanced in the capital markets via of different debt structures. To date, covered, secured and unsecured bonds, RMBS, ABS and loans have been issued globally to finance the buildings sector.

Generally, the choice of bond structure from the issuer is independent from the asset being financed. Usually, the borrower chooses the structure which best suits the deal based on many factors, including the issuer's credit worthiness, investor appetite and market conditions in a specific region.

Financing and refinancing options for home renovation programs in the capital markets, however, calls for a form of **aggregation**. Loans financing energy efficiency for residential properties tend to be too small to be financed in the capital markets directly. Instead, these need to be pooled together in order to reach a big enough size to justify the transaction costs associated with bond issuance.

This approach allows for loans of different sizes, different issue dates and different maturity dates to be bundled together. It requires the creation of an aggregation or warehousing platform which benefits from interim funding and could refinance itself in the bond market when critical volume for deal execution had been achieved. This is how the US PACE program essentially works, with PACE lenders doing the aggregation with interim financing from

banks and states, and refinancing themselves in the green bond market. This is also how consumer loan lender FlexiGroup (Australia) “collects” rooftop solar loans to create green ABS tranches in its securitisation deals.

Consumer loans can be refinanced in the bond market through ABS receivables such as Flexigroup’s. Credit card debt and consumer loans are unsecured and rank junior to mortgage claims but the aggregation of large pools of homogenous loans can reduce portfolio risk due to the benefits of diversification. This makes it possible to bundle such loans in ABS structures that have highly rated tranches.

The EuroPACE programme is currently looking at refinancing options in Europe. As the above analysis has shown, European financial institutions have a preference for covered, secured and unsecured bonds as well as RMBS to finance the property sector. These also represent viable options for refinancing EuroPACE loans.

Some of the bond types issued to date, are however more likely to represent more suitable options**: covered bonds, aggregation platforms** and **mortgages/RMBS**.

Covered bonds markets have proven to be a reliable source of term-dated funds for banks to on-lend in specific sectors targeted by policy makers, such as housing, which have perceived economic multiplier effects. Legislation governing the issue of covered bonds has now been introduced in almost 40 countries, therein recognising the contribution the market can make in aligning private-sector investment with public policy objectives.

Covered bonds have been issued in all four countries selected by the Consortium as eligible for EuroPACE future developments: Spain, Portugal, Belgium and the Netherlands. Spain, however, is perhaps the country best suited to using covered bonds to refinance the EuroPACE programme, as the use of the instrument is well established. The regulation underpinning the covered bond market could attract investors’ interest due to the superior credit ratings associated with the bonds.

Conversely, ABS issuance might not be an attractive option as the use of the instrument in Europe is less established than the US. However, aggregation platforms similar to those which support issuance of solar ABS represent a possible alternative. The NAB **Low-Carbon shared portfolio** represents a very insightful example, as it shows how loan aggregation can still be achieved without undergoing a securitisation process. Loans for home renovation can be partially sold to a closed-end investment vehicle, still retaining a portion of those on the issuers balance sheet. This type of structure delivers pari passu exposure to low-carbon assets for investors who have a mandate on investing in green assets.

On the other hand, issuance of green RMBS also constitute a viable option, as these have been widely issued in Europe. The banking sector could provide a substantial contribution financing home renovation programmes via issuance of energy efficiency mortgage and/or loans. This provides opportunities for scaling up as consumer loans for energy efficiency could be repaid with the mortgage at the same interest rates. Alternatively, owners of energy efficient properties could re-mortgage at lower interest rates with banks which offer green mortgage programmes.

Last but not least, aggregation platforms could take the form of a **fund**. Dutch asset manager Vesteda is an example. They have used CMBS, corporate bonds and more recently green bonds to refinance their residential portfolios. A fund structure could be combined with the structure of NAB’s low-carbon portfolio notes, i.e. pooling a number of loans / mortgages into a spin off SPV which is financed by a club of lenders. The benefit of this approach is that portfolios can be reasonably small while programmes ramp up and the issuer builds market credibility.

As the financing vehicles for EuroPACE loans grow, i.e. as the programme itself is adopted more widely, and the volume of loan originations increases, other alternatives (bonds, RMBS, etc) may become increasing viable and preferable. As noted, though, solutions would need to be jurisdiction specific and take into account market conditions to achieve favourable capital treatment and funding terms.

One further way to achieve scale is to pool loans from across regions and cities in a country, similar to the structure used by Sweden's SFF which acts as a funding vehicle for five different companies that each have their own funding capability as well. The creation of a common platform makes reaching scale easier and faster. Potentially creating a green bond issuance program (MTN) can allow for smaller bond amounts to be placed in the market, or for an initial bond to be tapped subsequently for small amounts as further pools of loans become available for refinancing.

Part III: Lending Principles

Defining the terms for loans and contracts standardisation

The EuroPACE programme intends to provide loans for home renovation and energy efficiency upgrades. Refinancing alternatives in the capital markets could be facilitated by creating a level of **standardisation** across consumer loans. Standardisation entails loan contracts underpinning common terms and conditions, which apply equally to each borrower.

Key elements for loans and contract standardisation are summarised below:

- Establish a performance target
- Define metrics for evaluation (pre- and post-issuance)
- Upfront due diligence
- On-going monitoring for compliance
- Ranking/rating of the loans
- Term of the loans and repayment schedule

For energy efficiency upgrades, standardisation means setting a **performance target**, i.e. the level of improvements required for eligibility. This should be specified in advance and defined as the minimum level of improvements required which is calculated according to the average energy efficiency of buildings in a specific country or region. Fannie Mae's Green Rewards financing program provides an example of combined targets for improving energy and water consumption performance when undertaking residential building upgrades.

Alternatively, recognition of industry certification schemes which guarantee a specific level of improvement also represents a viable option. High levels of ambition are of course preferable, but it is also important to focus on schemes that reward energy efficiency. For example, IFC's EDGE is focused on energy efficiency and emissions.

Metrics for evaluation of energy efficiency upgrades are essential to measure the performance level, as well as define the performance target. Often, metrics for energy efficiency improvement are defined as percentage improvements or in terms CO_2 emissions reduction. The Climate Bonds Standard for instance uses a low-carbon trajectory based on a 1.5-degree scenario; this method uses the top 15% of most efficient buildings as a starting point (see annex IV for more details). The metrics for evaluation should be defined pre- and post- loan issuance to ensure consistency as well as guarantee effective energy efficiency improvements.

When the preferred metrics are not available, proxy metrics could be adopted. For example, in Norway direct data on energy performance of buildings is not available, but CBI has adopted a proxy – the 2010 and 2017 Building Codes which require certain (high) levels of energy efficiency performance for new buildings and upgrades.

EPC ratings could also be used as a proxy given their adoption across Europe. However, the testing approaches and cut-off levels for rating bands would need to be harmonised for this approach to be effective across the EU. This may even be applicable within individual countries if there are different practices or regulations in different regions or cities. Notably, harmonisation is preferable but alternatively detailed disclosure on approaches, rating bands, assumptions, etc. could provide the same level of comfort so the programmes adopt the same desired energy performance levels and targets.

Upfront due diligence such as the assessment of improvement options and repayment period are also crucial for standardisation purposes. Similar range of improvements are more likely to constitute similar investment costs per property, which entails origination of loans of similar size.

Risk assessments that relate to property insurance risks such as risks of flood, fire, subsidence, etc. and the level of insurance obtained are also important. For larger properties, building surveys with comprehensive capex plans should be sought to plan financing and structure funding products that take this into account.

On-going monitoring for compliance is essential to guarantee that renovation works are taking place in a timely manner and delivering on the energy efficiency improvement targets. This is also relevant to ensure that the terms set in the contracts meet pre- and post-issuance conditions. In addition, on-going monitoring provides checks and balance on contractors' operations, ensuring a fair and transparent process and interaction with customers.

In the context of climate change mitigation, energy performance metrics and targets should be set to ensure the property meets net zero emissions by 2050. Ongoing monitoring should ensure that that the asset is still on track to achieve net zero.

Ranking of the loan, such as same as taxes or mortgages is crucial to determine the payout order in case of borrower's default. Higher rankings may decrease investments and hence increase investor appetite. Concurrently, owners of properties associated with a mortgage may experience opposition from the mortgage provider, as banks have a preference for mortgages being more senior to any other debt type. Generally, however, loan standardisation would entail that each loan is associated with same level of seniority.

Same **loan terms and repayment schedule** also supports standardisation for energy efficiency loans. Regular and consistent repayment periods could facilitate the use of aggregation platforms for refinancing options, including repayment to investors via loan receivables or securitisation of the underlying loans.

Loans standardisation and homogeneity is also a pre-requisite for STS treatment. As previously suggested, it is unlikely that EuroPACE loans will qualify for STS treatment at this stage due to unavailability of historical data. However, once the product gains traction and more data are obtained, a more standardised product incorporating all the above elements might facilitate STS treatment.

Homogeneity can be achieved by targeting loan sizes within a band, for specific profile of customer (or a fixed range of profiles) and for loan terms that are the same or similar.

Loan standardisation can be achieved by using template contracts – similar to car leases – that do not allow for negotiated terms. This makes bundling loans into a securitisation considerably easier. It also saves on legal costs for running the programme.

Conclusion

Research conducted by CBI suggests that ABS securitisation using the same model across Europe is unfortunately not possible. In addition, EuroPACE loans are not eligible for STS treatment due to a lack of historical data which is a key requirement for eligibility.

Instead, more localised solutions are needed. CBI evaluated how green buildings have been financed in the green bond market across the globe, showing that a range of debt structures can successfully be employed to finance green buildings. The analysis also offers insights on green credentials required for eligibility in the green bond market worldwide.

Refinancing EuroPACE loans calls for some form of aggregation, as such transactions are too small to be financed in the capital markets. Warehouse structures, such as the NAB Low-Carbon Portfolio, as well as platforms used to aggregate rooftop solar loans have been identified as suitable structures that could also be used to aggregate EuroPACE loans, allowing for refinancing in the capital markets.

Refinancing options have been evaluated in the European context, with particular focus on four countries selected by the Consortium: Spain, Portugal, Belgium and the Netherlands. As highlighted in the above data, securitisation markets are mostly developed in the US, which have provided fertile ground for issuance of PACE ABS bonds. In Europe, however, covered bonds, mortgages/RMBS and aggregation platforms represent more viable solutions to refinance EuroPACE loans, as such debt structures are more widespread in Europe.

Additional options include pooling loans into a fund, which would allow to aggregate a reasonably small number of loans while the programme rumps up and the issuer builds credibility, as well as aggregation of loans across cities and states by means of funding vehicle similar to SFF.

Finally, creating standardisation around contracts for consumer loans financing energy efficiency according to the lending principles described in section III could facilitate refinancing in the capital markets, and could provide grounds for STS eligibility once more data becomes available.

Annex I
US PACE Programme

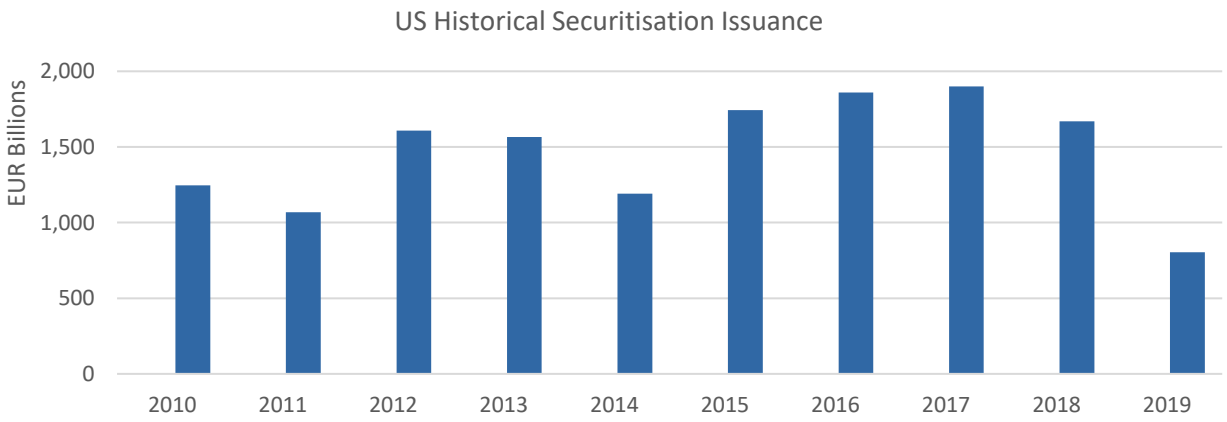
Eligible assets

- Renewable & Alternative Energy Products
  - Solar Photovoltaic
  - Solar Thermal
  - Small Wind Turbine
  - Advanced Energy Storage System
  - Electric Vehicle Charging Station
  - Stationary Fuel Cell Power System

- Energy Efficiency Products
  - High-efficiency HVAC
  - Building envelope (insulation, cool roofing, air sealing etc)
  - High-efficiency lighting
  - High-efficiency Pool Equipment
  - High-efficiency Water Heating
  - Windows, Doors and Skylights

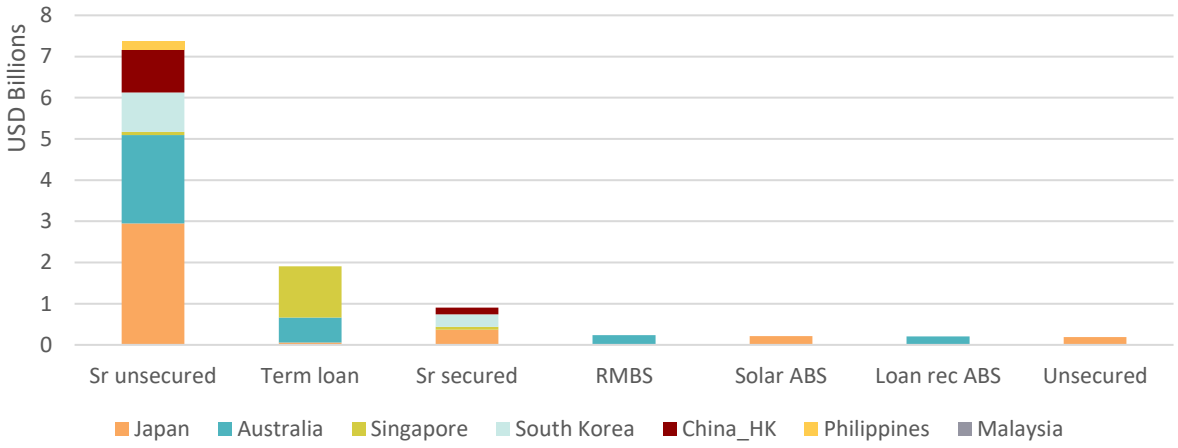
- Water Efficiency Products
  - Indoor Water Efficient Fixture & Fittings
  - Outdoor Water Efficient Landscaping

Annex II
US Historical Securitisation Issuance



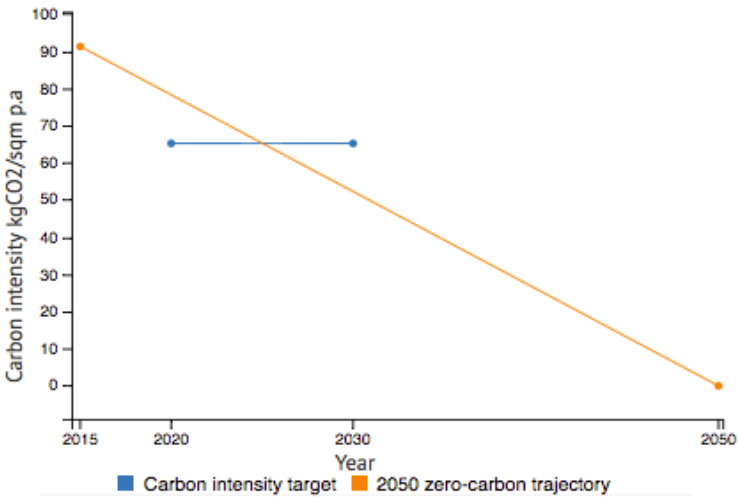
Annex III

Financing low-carbon buildings in the Asia-Pacific Region



Annex IV

Buildings Criteria – Climate Bonds Standard :Compliance pathways align local markets with a 1.5-degree scenario



Start of trajectory = Top 15% most emissions efficient buildings in a city

End = Zero emissions in 2050

Emissions performance trajectories produce emissions targets (kgCO2/sqm) according to bond issuance date and bond term.

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