



# EeMAP

Energy efficient  
Mortgages  
Action Plan

## ENERGY EFFICIENT MORTGAGES ACTION PLAN (EeMAP) INITIATIVE

EeMAP ENERGY EFFICIENCY (EE) FINANCING: EMERGING ANALYSIS

June 2017

# INTRODUCTION

The Energy efficient Mortgages Action Plan (EeMAP) Initiative is a ground-breaking mortgage financing initiative to support energy efficiency improvements in buildings. The Initiative represents the first time a group of major banks and mortgage lenders, as well as companies and organisations from the building and energy industries have proactively come together to discuss the private financing of energy efficiency.

The EeMAP Initiative aims to create a standardised “energy efficient mortgage” based on a private bank financing mechanism with preferential interest rates for energy efficient homes and/or additional funds for retrofitting homes at the time of purchase. In doing so, the Initiative will encourage energy efficient improvement by households of the EU’s housing stock by way of financial incentives linked to the mortgage. In this way, the mortgage and covered bond industries can help to bridge the renovation gap with private financing for the energy efficient improvement of buildings, and in this way support the EU in meeting its energy savings targets, whilst at the same time creating a strong link between the Capital Markets Union agenda and the energy efficiency agenda.

The Emerging Analysis aims to identify trends and dimension in the green/ energy efficiency finance, with a focus on the mortgage and covered bond markets. The trends identified in this analysis constitute an important market snapshot from a broad sectorial and geographical coverage from which the EeMAP Initiative can progress. The analysis also tries to recognise core features which will be key in the future consideration of the final Energy Efficient Mortgage product design.



# TABLE OF CONTENTS

Executive Summary .....	4
Energy Efficiency within the Mortgage Lending & Covered Bond Value Chain .....	6
Value Chain: Explanatory Steps .....	8
European Housing Stock & EU Framework .....	9
Energy Efficient Finance: Research & Perspective .....	10
■ PART I – Origination Process and Green Features .....	11
■ Part II – Risk management / Data and Valuation .....	15
■ Part III – Energy Efficiency Measurement & Internal Procedures .....	22
■ Part IV – Green Rating Agencies & Bonds .....	25
■ Part V – Green Investments .....	27
International Case Studies .....	31
United States .....	31
Japan .....	33
Canada .....	34
Disclaimer .....	37
EeMAP Initiative Supported By .....	38
Contact .....	<b>Back Cover</b>

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# EXECUTIVE SUMMARY

Banks can play a game changing role in providing long-term financing for energy improvements to the existing European housing stock. They intervene at the most critical moment, when citizens purchase a property, and mortgages help individuals and families to access homeownership, thereby allowing them to secure a key part of their social expectations. The banking industry has a key role to play in improving the quality and energy performance of housing so as to free-up disposable income and, in parallel, reduce credit risk for borrowers, lenders and investors. A pan-European energy efficiency mortgage initiative in this area will help to coordinate market interventions, create synergies in the mortgage and covered bond value chain, delivering a virtuous circle between lenders, borrowers and investors from the origination of the mortgage to the pooling of energy efficient collateral that would be the underlying collateral for “green” covered bonds.

1. Buildings are responsible for 40% of energy consumption & 36% of CO<sub>2</sub> emissions in the EU.
2. By improving the energy efficiency (EE) of buildings, total EU energy consumption could be reduced by 5%-6% and CO<sub>2</sub> emissions by 5%.
3. 75-90% of the building stock in the EU is predicted to continue to stand in 2050 making energy efficient refurbishment a top priority for Europe.
4. In the context of the EU's energy savings targets for 2020 and 2030 and of COP21, there is a role for **a private, bank financing initiative to support households in the energy efficient (EE) renovation of their homes or in the acquisition/construction of energy efficient real estate**. The Initiative is independent from, but complimentary to, public funds, tax incentives and utility rebates.
5. The EeMAP Initiative rests on two assumptions:
  - Improved EE of the property lowers the PD of the borrower as energy savings are recouped in the energy bill, leaving more disposable income in the household. A renovated house that moves from an 'E' to a 'B' grade in its energy performance certificate (EPC) will save an estimated EUR 24,000 over 30 years, according to an analysis of 365,000 house sales in Denmark last year.
  - Improved EE increases the value of the property. From a price perspective, an increase in energy performance can correspond to the adding of an extra 10-15 m<sup>2</sup> to the size of a property.
6. These two assumptions drive an incentive chain relevant in both base cases i.e. the energy efficient renovation of property as well as the acquisition/construction of energy efficient properties. This incentive chain provides a micro-economic advantage to all stakeholders: borrowers, lenders, investors and SMEs in terms of wealth conservation, risk mitigation, energy conservation and job creation.

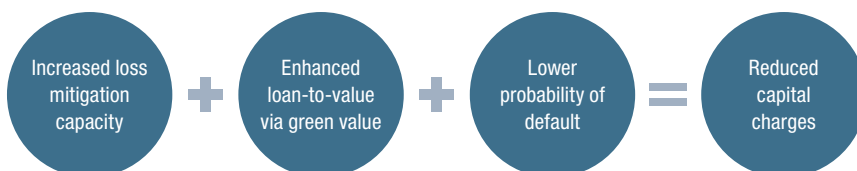
7. Based on a set of energy efficiency indicators, lenders will offer a discount in the interest rate after a certain period of time according to the improvement in the energy rating or performance of the property, or provide additional funds at the time of origination to finance EE renovations.
8. Measurement of the energy efficiency improvement will build on research on how to more accurately predict energy costs in mortgage affordability calculations, and likely be based on three pillars: (1) the Energy Performance Certificate (EPC) and (2) a consumption indicator in the short term and (3) a demand indicator in the longer term. The evaluation and validation of the energy efficiency improvements using the above-mentioned indicators would be delivered by external/third party providers.
9. This Initiative will address 3 areas of potential risk: credit risk, asset risk and performance risk
10. The Initiative will bring sustainability into the conversation between borrowers and lenders at point of purchase/re-mortgage, thus help triggering the rate of energy efficient renovation necessary to meet the EU's climate and energy targets.
11. The focus of this Project is on lending on **residential property**, but potentially the underlying mechanism should also be deployed in the context of **commercial property lending** where applicable.
12. In the context of their successful application for Horizon 2020 funding, the EeMAP Consortium Partners will concretely undertake 5 'operational' Work Packages, each with a clear set of deliverables: **(1) Identification and summary of market best practices, (2) Definition of an energy performance indicators and a Building Energy Passport, (3) Identification of pre-requisites for the assessment of “green value”, (4) Substantiation of correlation between EE & probability of default – portfolio analysis and (5) Definition and design of energy efficient mortgage, based on preferential financial conditions.**

## OBJECTIVE & UNDERLYING BUSINESS CASE

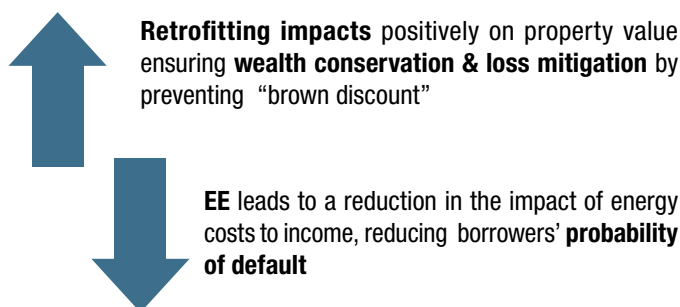
The **ultimate objective** is a pan-European private bank financing mechanism, based on a standardised approach, to encourage energy efficient improvement by households of the EU's housing stock by way of financial incentives linked to the mortgage, and in this way support the EU in meeting its energy savings targets.

Independent from, but complementary to, public funds or tax incentives

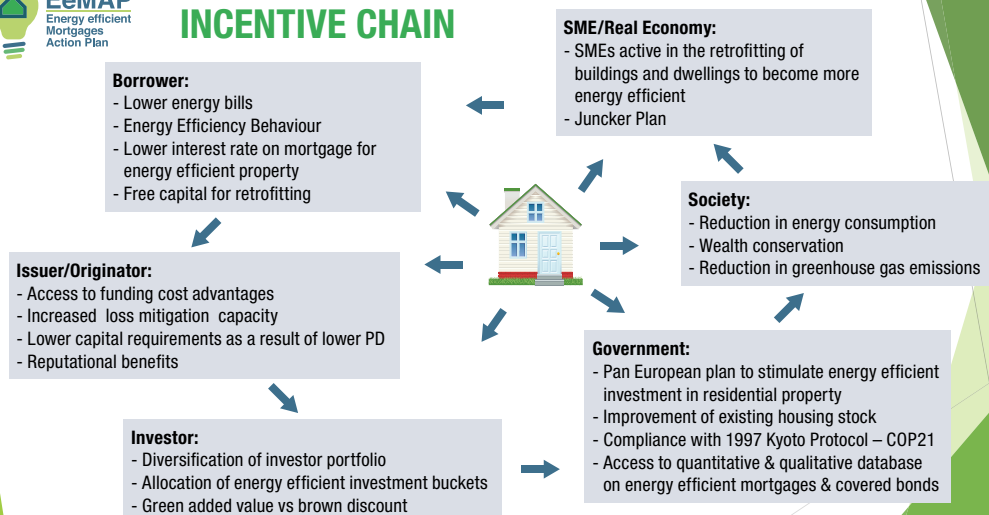
### Underlying business case



## UNDERLYING MARKET CHARACTERISTICS IMPACTED BY ENERGY EFFICIENCY (EE)

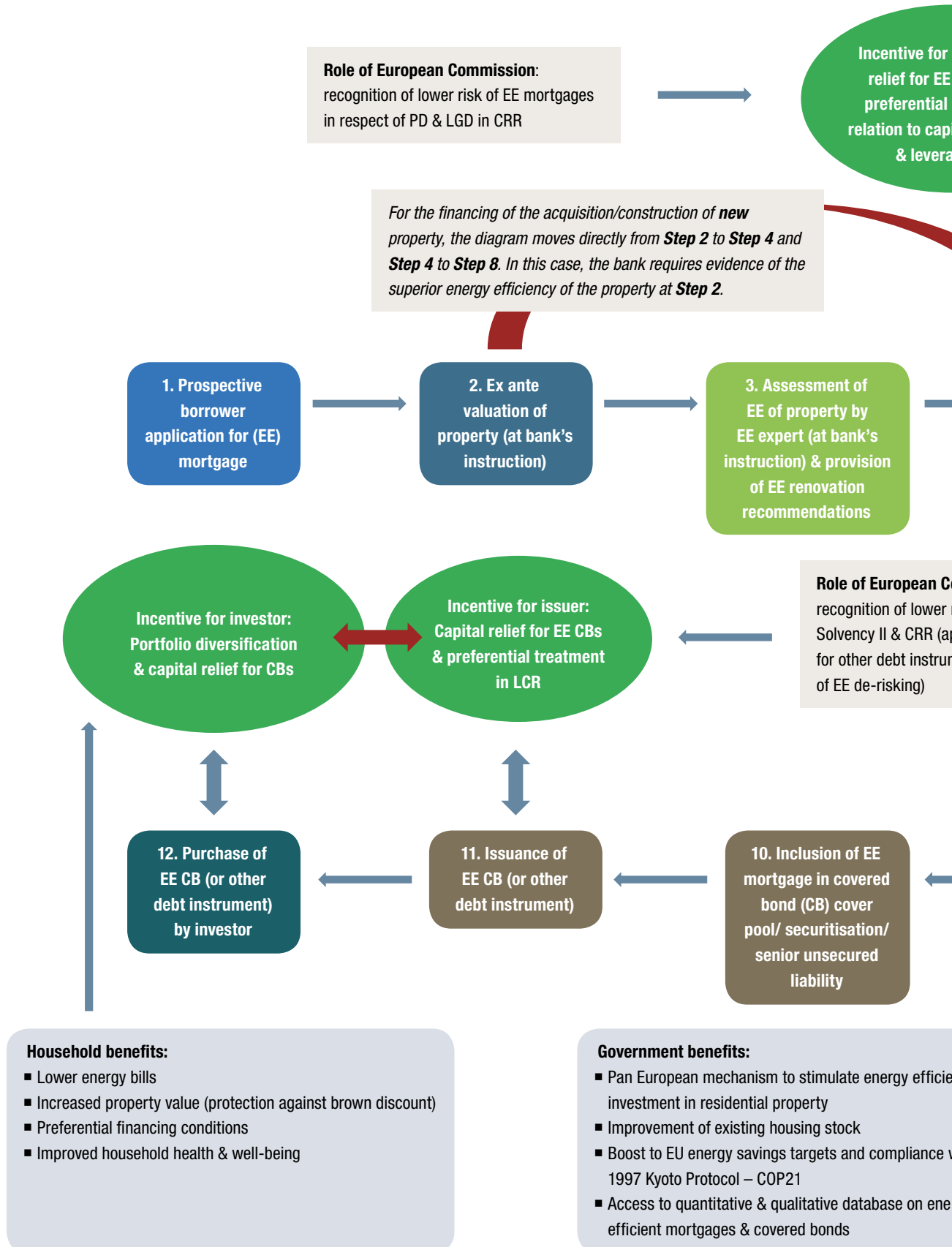


## INCENTIVE CHAIN

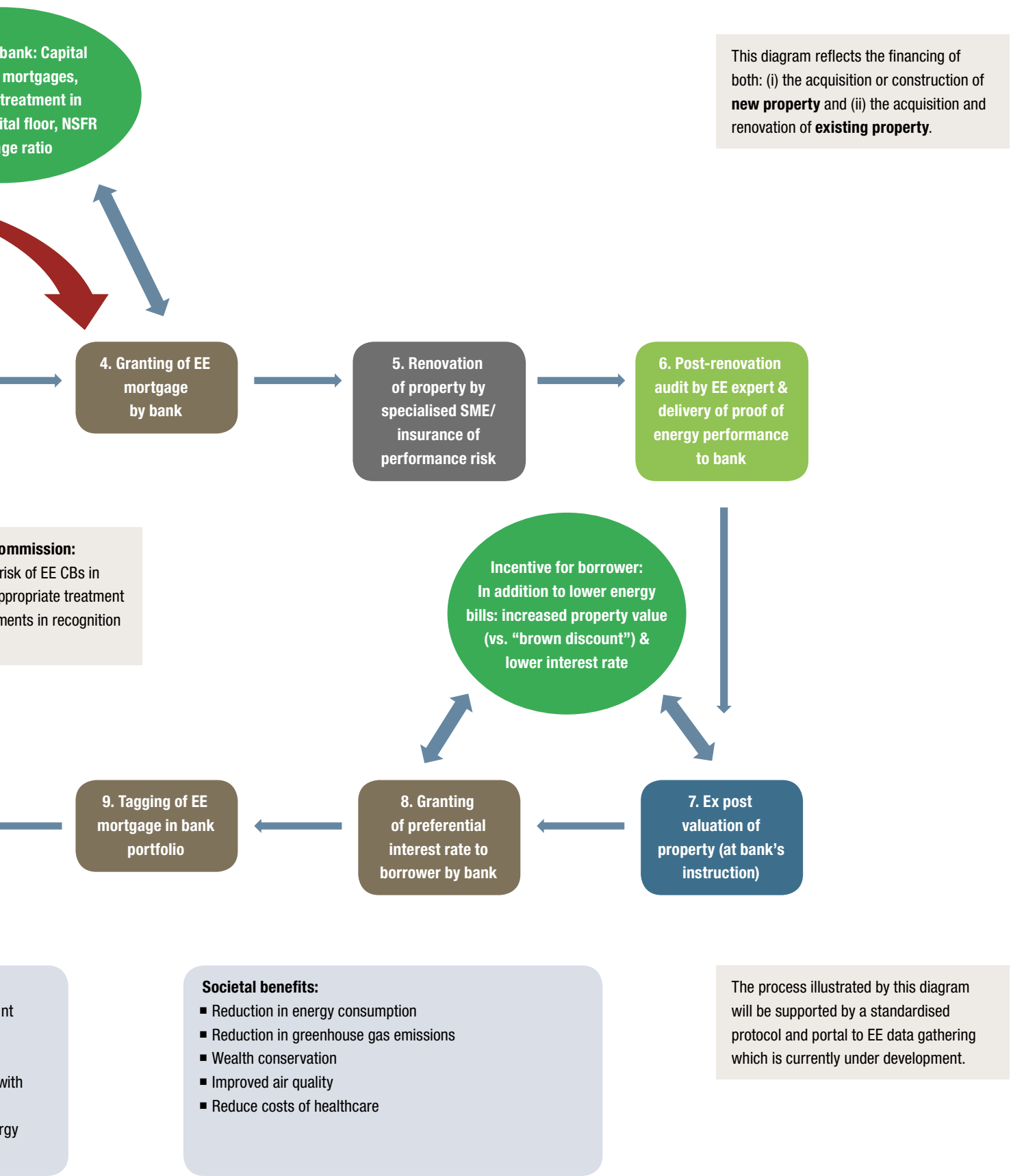


# ENERGY EFFICIENCY WITHIN THE MORTGAGE LENDING &

This diagram illustrates the incentives inherent to the mechanism promote additional and ongoing synergies in the value chain. At the time of writing the diagram is still undergoing market review and remains a preliminary and aspirational draft.



# COVERED BOND VALUE CHAIN



## VALUE CHAIN: EXPLANATORY STEPS

**Step 1:** In the case of the financing of the acquisition of an existing property, the bank initiates a conversation with the prospective borrower on the potential EE improvement of that property. As proof of the current EE of the property to be financed, the borrower provides the bank with existing relevant documents already in their possession (e.g. EPC or energy performance contract). The bank offers an EE mortgage loan for the acquisition and renovation of the property according to the definition delivered by the EMF-ECBC Energy Efficient Mortgages Initiative. At this point, the bank can also offer an EE mortgage loan for the acquisition/construction of a new build property (which is already/will be EE).

**Step 2:** The bank commissions an *ex ante* valuation of the property.

**Step 3:** The bank commissions an assessment of the energy performance of the existing property. The energy inspector carries out an energy audit, makes recommendations for improvements and also presents the public subsidies/fiscal supports available to the borrower in order to maximise the EE improvement capacity.

**Step 4:** The bank grants the EE mortgage loan, including additional funds to finance the EE improvement in the case of an existing property.

**Incentive for bank:** In the context of the CRR, the bank is granted capital relief for EE mortgage loans and receives preferential treatment for the EE part of its loan book in relation to the capital floor, the NSFR & the leverage ratio.

**Step 5:** The renovation of the property is carried out by a certified, specialised SME.

**Step 6:** The energy inspector responsible for the original energy audit and recommendations carries out an inspection of the renovation work and certifies the improvement, which is communicated to the bank (and borrower).

**Step 7:** The bank commissions an *ex post* valuation of the property.

**Step 8:** In the case of the financing of the acquisition/construction of a new property, the bank provides a preferential interest rate at the time of origination of the mortgage. In the case of the financing of the acquisition and renovation of an existing building, on the basis of the EE improvement of the property, the bank adjusts the interest rate of the mortgage accordingly at this stage. Note: some banks are already providing discounted interest rates for 'green' loans.

**Incentive for borrower:** In addition to lower energy bills, by improving the EE of their property, they increase the value of the property value, protecting their investment against "brown discount" & secure a lower interest rate on their mortgage loan.

**Step 9:** The EE mortgage loan is tagged in the bank's loan monitoring system.

**Step 10:** The EE mortgage loan is included in the bank's mortgage cover pool. The bank provides reporting about the share of EE mortgage loans in its mortgage cover pool.

**Step 11:** The bank issues an EE covered bond, or another debt instrument such as a securitisation or a senior unsecured liability.

**Incentive for issuer:** The issuer is granted capital relief for EE covered bonds under the CRR and Solvency II and receives preferential treatment for its EE covered bonds in LCR under the CRR. Appropriate preferential treatment should also be accorded to other debt instruments reflecting the EE de-risking factor.

**Step 12:** The investor purchases the EE covered bond, or another debt instrument such as a securitisation or a senior unsecured liability.

**Incentive for investor:** The investor achieves diversification of its portfolio, can more easily allocate EE investment buckets and benefits from the capital relief for covered bonds under the CRR and Solvency II. Appropriate preferential treatment should also be accorded to other debt instruments reflecting the EE de-risking factor.

**The lower risk of collateral with EE features could further be supported through recognition by national authorities.**

# EUROPEAN HOUSING STOCK & EU FRAMEWORK

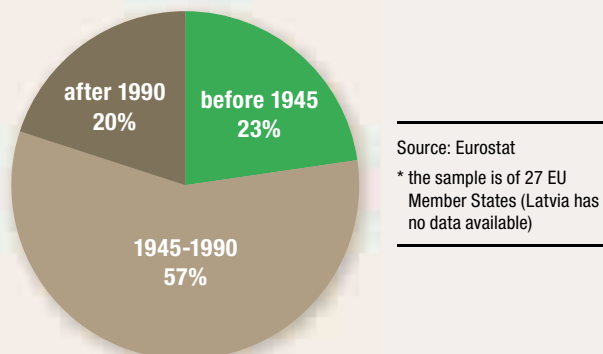
International, institutional and investor interest in energy efficiency finance has increased in magnitude in recent years, supported by the successful conclusion of the COP21, a universal legally binding global climate action plan to limit global warming to well below 2°C<sup>1</sup>. This has worked as a catalyst for energy efficiency finance across financial markets and imposed a new trajectory for European Union (EU) Member States' engagement in energy consumption.

The EU has set itself an overall 20% energy efficiency savings target by 2020 and is now considering increasing this to a 30% target by 2030. The scale of investment needed to meet the 2020 target is estimated at around €100 billion per year, with it considered necessary to invest around €100 billion a year up to 2050 in the EU building stock in order to deliver Europe's commitments on climate change. With about 35% of the EU's buildings being over 50 years old, massive thermal renovation of the building stock is a necessity to reach these climate goals.

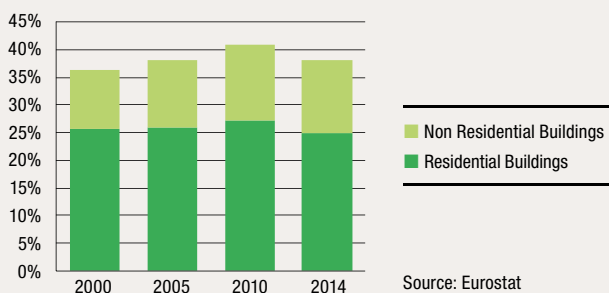
## Current Situation in Europe and Legal Framework

Buildings are responsible for the largest share of European final energy consumption (40%) and they represent the greatest potential to save energy – 80% of existing buildings in the EU were built before 1990 with very limited, energy-related building codes and the energy intensity of heating per floor area is two times higher than any other region of the world.

**Housing Stock age structure in the EU\***



**Energy Consumption of Buildings in the EU**



Buildings are long-term assets expected to remain useful for 50 or more years and 75-90%<sup>2</sup> of the EU's existing building stock is expected to still be in use in 2050. The principal challenge for Europe's EE policies for buildings is to improve and upgrade the existing building stock, as demolition rates (0.1% per year) and renovation rates (1.2% per year) are very low and only 1% of new builds are highly energy efficient.

The European Commission describes EE as the EU's biggest energy resource, one of the most cost effective ways to enhance the security of its energy supply and decrease GHG emissions. The International Energy Agency has called investments in energy efficiency and particularly in buildings a priority for all countries, and the Energy Efficiency Financial Institutions Group (EEFIG) calls for EE to be viewed as "the first fuel, because it is competitive, cost effective and widely available".

The EEFIG calls for the direct support of EE retrofits to buildings, including housing, as a priority for the European Structural and Investment Funds, Horizon 2020, ETS Revenues (Emission Trading System). Each Member State decides on the use of its EU ETS revenues. However, the EU ETS Directive recommends that at least 50% of these revenues be used for climate action interventions including research and development in EE and clean technologies.

In 2014, DG Energy called for Member States to include Energy Performance Certificates (EPCs) as a requirement for the use of public funds for building retrofits. Member States have developed a wide range of EPCs throughout Europe, with some being much more capable of predicting a building's energy consumption. The Cohesion Policy Program 2014-2020 provides EUR 23 billion, which could be applied to large-scale EE retrofit programmes.

EE in the residential sector benefits from a wide range of policy actions, such as regulatory and financial/fiscal measures, as well as information- and awareness-raising measures, voluntary agreements, infrastructure investment (smart-metre roll outs), market based instruments, and others. Regulatory measures mostly relate to the implementation of the Energy Performance of Buildings Directive (EPBD), including minimum energy performance requirements and certificates for new and existing buildings and inspections of water boilers and air conditioning systems, and the Ecodesign Directive, including EE standards for appliances and equipment. Moreover, to help reach the 20% target, the Energy Efficiency Directive's (EED) Article 7 requires Member States to establish an "energy efficiency obligation" scheme, which obliges EU energy companies to achieve yearly energy savings of 1.5% of annual sales to final consumers<sup>3</sup>. In order to reach this target, companies have to carry out measures which help final consumers improve EE. This may include improving the heating system in consumers' homes, installing double glazed windows, or better insulating roofs to reduce energy consumption.

Financial and fiscal measures that support EE improvements in the EU include grants and subsidies. A few Member States (France, Germany, Greece, the Netherlands and Portugal) offer loan programmes. Tax relief on EE upgrades for households is reported for Denmark, Finland, France, Germany, Greece, Italy, the Netherlands and Portugal. Six Member States (Austria, Denmark, Estonia, Germany, the Netherlands and Sweden) have put in place energy taxes that aim to change behavioural and investments in EE. Smart meters are expanding for to residential customers in Austria, Cyprus, Denmark, Finland, France, Greece, Ireland, Latvia, Malta and the United Kingdom.

<sup>1</sup> The Paris Climate Change Agreement adopted during COP21 in December 2015 sets out a global action plan that helps avoid dangerous climate change by limiting global warming to well below 2°C. It was adopted by 195 countries as the first-ever universal, legally binding global climate deal. The Agreement is due to enter into force in 2020.

<sup>2</sup> Energy Efficiency Financial Institution Group (EEFIG). 2015. Energy Efficiency – the first fuel for the EU Economy How to drive new finance for energy efficiency investments. Available: <https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report%20EEFIG%20v%209.1%2024022015%20clean%20FINAL%20sent.pdf>.

<sup>3</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013SC0451&from=EN>.

At EU level, the European Commission has increased the number of public funds available for EE. However, it has also suggested that there is a need to boost private EE investments. With the EU framework in mind, there is a **clear role for a private, banking sector led financing initiative to support households in making EE improvements to their homes**. The EeMAP Initiative aims to assist the EU in reaching its energy target, by bringing

together all the necessary competencies – financial, building and EE, property valuation, energy provision and data – to develop a **credible, workable and marketable pan-European Energy Efficient Mortgage Product** with the aim to mobilise mortgage financing to incentivise borrowers to move their property out of the ‘brown zone’, and into the ‘green zone’ in return for a preferential interest rate on the mortgage and the retrofitting funds.

## ENERGY EFFICIENT FINANCE: RESEARCH & PERSPECTIVE

A wide-ranging sectorial and geographical research exercise on ‘green’ finance has been arrived out by the EMF-ECBC during 2017 with the aim of creating a screenshot of the current market practices and conception and market prediction going forward.

The perspectives presented here below provides insight into both current and past examples of ‘green’ mortgage finance and offers insight to most common bottlenecks hindering further market development and the foreseen integration of Energy Efficient Mortgages. It also present influential findings for the future consideration of the final Energy Efficient Mortgage product design.

### FOUR KEY FINDINGS:

- Importance of standardisation within the ‘green’ mortgage finance market;
- Strong willingness in further development of and entrance into the ‘green’ market;
- Better understanding of how to differentiate between ‘green’ and conventional financing within data gathering, portfolios and risk management processes;
- Better understanding of how to capture EE within lending practices and how it translates into impact on property value.



# PART I

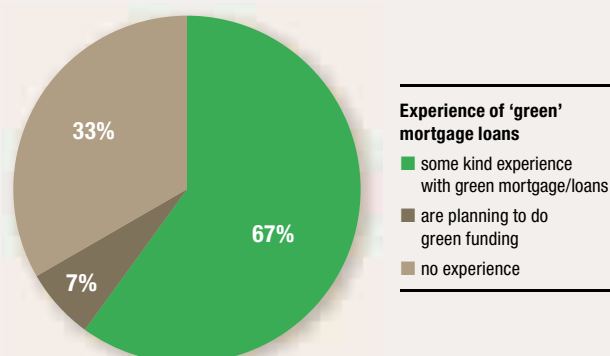
## ORIGINATION PROCESS AND GREEN FEATURES<sup>4</sup>

### EXPERIENCE OF 'GREEN' MORTGAGE LOANS & MOTIVATION

**1.A)** Does your organisation have experience in 'energy efficient'<sup>5</sup>, 'green'<sup>6</sup> or 'sustainable'<sup>7</sup> mortgages/lending (referred to hereafter as 'green' mortgages/lending)? If yes, please provide the product definition and describe the product (e.g., mortgage purchase; refinance of senior mortgage; renovation loan for energy efficiency, renewable energy installation; other), numbers of mortgages by year of origination, and specify which elements (e.g. energy efficiency, sustainability features etc.) are considered in the origination process. Please also indicate what percentage of your loan portfolio these loans represent.

20 organisations (equal to 67% of respondents) reported some kind of experience with 'green' mortgage/loans:

- The answers show that different products are provided/available in the market: renovation loans, energy efficiency cash loans, 'green' consumer loans and 'green' mortgage loans.
- For 'green' mortgages (covering both commercial, retail and residential) the following features were generally reported: preferential interest rate, rebate and/or tax advantages. Some organisations report that such products represent a growing share of their portfolio while others (five organisations) report having closed their 'green' product lines (covering both mortgages and loans) either due to a cancellation of government subsidies or due to low volumes.



- Preferential top-up (mortgage) renovation loans depending on the LTV level are also offered by some organisations if linked to energy savings by allowing energy expenses to be deducted.
- Likewise, 'green' loans are offered with a discount in pricing for energy-saving measures/ renovations.
- Two organisations (7% of the 67%) report that 'green' finance is on their agenda, with one of them planning to offer 'green' loans in 2017.
- European DataWarehouse provides loan-level data and documentation storage solutions for 'green' assets.

**1.B)** What is your motivation to offer 'green'/energy efficient mortgages?

Organisations offering some kind of 'green' products (67%) listed the following arguments:

- 'Green' products are the future;
- Diversification of investor basis;
- Offer innovation and competitive products to customers to support their needs and strengthen the client relationship;
- Added value to investors;
- Improved credit and assets quality;
- Marketing measures;
- Energy savings;
- Development of local network;
- Regulatory-driven and government support;
- Sustainability strategy;
- Social responsibility.

Organisations which are currently not engaged in the 'green' market also reported many of the above motivations for possibly entering into the market at a later stage.

**1.C)** Is your organisation's product defined as 'green' according to a specific green property certification (e.g. the Energy Performance Certificate (EPC) or energy labelling schemes such as Energy Star, LEED, BREEAM, DGNB, HQE, LEED, Miljöbyggnad etc.) and which of the energy ratings (e.g. A-G or other) are considered as eligible for 'green' mortgages?

The answers to this question were divided. Either specific requirements have to be fulfilled, e.g. energy/consumption related, European certified standards, EPCs, exclusions of energy levels lower than B or in some cases A, or certain green certification and additional green criteria have to be met in order for the product to qualify as 'green'.

In other cases, the funding can be defined green "simply" due to the tax advantage or government subsidies linked to the loan independently from the energy rating upgrade received at the end of the restructuring works. In other words, the act of improving the energy rating is what defines the project/loan as 'green', albeit the overall rating could still be low.

**1.D)** Does your organisation allow for an upgrade from a conventional mortgage to a 'green' mortgage if the overall energy rating of the underlying asset is improved due to renovation?

<sup>4</sup> For the purposes of this data collection exercise, the questions within Part I-IV relate to both residential and commercial properties.

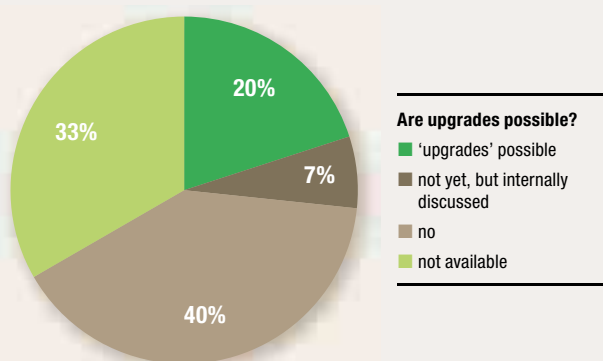
<sup>5</sup> Where the term 'energy efficiency' is used we are interested in products which focus on the energy performance.

<sup>6</sup> Where the term 'green' is used we are interested in products which focus on the energy performance and wider environmental performance (e.g. water efficiency, resource efficiency etc.).

<sup>7</sup> Where the term 'sustainable' is used we are interested in products which focus on the above, as well as wider sustainability performance (e.g. social indicators, CSR, location, occupant wellbeing etc.).

The 20 answers given (67%) can be grouped into the following three categories:

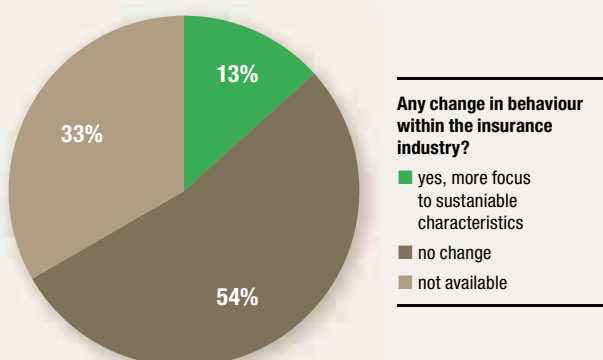
- Either the mortgage cannot be changed;
- The mortgage can be changed, but any pricing incentives are only linked to newly granted loans, or a 'green' loan can be used to prolong the original interest depending on the fulfilment of certain energy consumption requirements. One organisation allows such an upgrade but only for commercial real estate;
- Or the possibility of allowing such an upgrade is under internal discussion.



**1.E)** Have you observed a change in behaviour within the insurance industry with regard to the sustainable characteristics of properties? If yes, please specify.

The 13% (four organisations) which had observed a change in the insurance industry noted that more focus was given to properties with sustainable characteristics and that additional demands were required in order to take into account market developments.

53% (16 organisations) reported no change.



**1. F)** If you answered NO to question 1.A), what are the main barriers for your organisation to offer 'green' mortgages? Are there financial or other constraints within your organisation regarding capacity to originate 'green' / energy efficient mortgages separately from your standard approach?

Eight organisations identified the following barriers:

- Size of balance sheet;
- Not a local priority;

- No incentives;
- Lack of public discourse;
- Difficulties in translating energy efficiency into 'green' value;
- More understanding needed;
- Current legal framework;
- IT systems allowing 'green' filtering.

**1. G)** If your organisation has no prior experience with 'green' mortgages, what would you consider as essential to include in a 'green' product definition?

The following recommendations were made:

- The definition should include a clear impact on the value of the property due to 'green' retrofitting;
- Savings in term of energy expenses;
- Include the notice of sustainability;
- Include reference to the European Union Directive 2001/91/EC or to a similar widely acceptable label for energy efficiency;
- Include tangible benefits evident to the customer along with clearly associated conditions;
- Clarity on the funding and repayment mechanism, including any lender or market limits;
- Clear guidance in regards to what qualifies for the lower priced funding;
- A consistent framework for setting the baseline and for reviewing the energy efficiency of a property;
- Guidance and support on appropriate data capturing;
- An efficient reporting mechanism with an acceptance that a responsibility to provide relevant mortgage information would be incumbent on participating lenders;
- Data management should be covered;
- The creation of specific portfolios for such loans;
- Require better efficiency of environmental factors;
- The definition should be linked to the building's rating as an initial means of qualification;
- Ongoing revaluation in order to ensure sustainability and qualification;
- A specific harmonised scale for 'green' mortgages based on the increased efficiency of the underlying property is important across Europe;
- The creation of incentives for market players is crucial for the development of such a market, hence, the recognition of a different prudential regulatory treatment in terms of a lower risk weight for energy efficient mortgages – when properly justified from a credit risk perspective – would be a key driver for the positive development of a 'green' product market.

## ORIGINATING 'GREEN' MORTGAGES<sup>8</sup>

**1.H)** When launching your 'green' mortgage product, were any changes/ adjustments made to the conventional mortgage proposition? E.g. are pricing

<sup>8</sup> Please note that for graphs where the underlying question refers back to a previous question the basis differs.

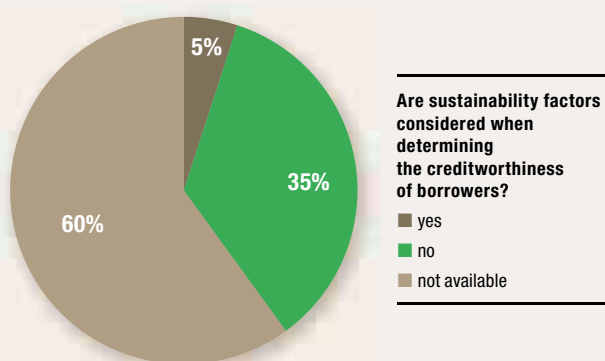
incentives (e.g. interest rates) included in the origination process of your 'green' mortgage? If yes, please specify.

Based on the input received from six organisations, the benefits are often linked to a 'green' mortgage or loans are given without any changes/adjustments made to the conventional proposition.

Price incentives are given depending on whether eligibility criteria are met, government subsidies are given or if the product has specific features (such as a preferential interest rate and/or tax advantages) linked to it.

**1. I)** When granting mortgage loans, are sustainability factors, e.g. energy costs related to the building, taken into account when determining the creditworthiness of borrowers?

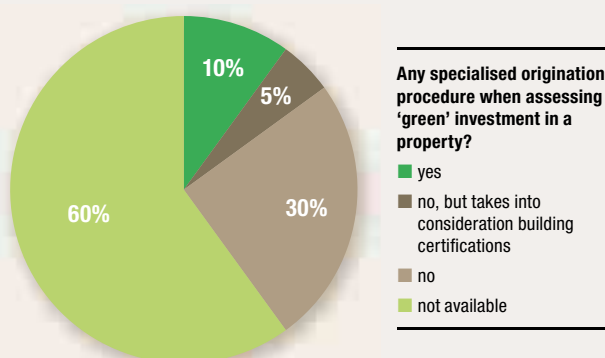
- Several organisations (35%) note that sustainability factors are not considered when determining the creditworthiness of borrowers. One organisation notes that the creditworthiness is fixed at a certain level depending on the operation's loan-to-value, e.g. a building of a good energy class means a higher value of the property.
- One organisation reports taking into account sustainability factors when determining the creditworthiness of borrowers.



- 60% (12 organisations) did not provide an answer.

**1. J)** Does your organisation deploy a specialised origination procedure when assessing a 'green' or energy efficiency investment in a property? Examples include higher debt-to-income or loan-to-value ratios, other.

- Of those organisations which provided an answer, the majority (six organisations) do not deploy a specialised origination procedure nor higher requirements regarding creditworthiness, ratios or a divergent evaluation procedure. That is to say, the ratings of the clients do not depend on energy efficiency elements. One organisation, however, added that if a building's energy certification is present, and fulfils the internal criteria, then a discount can be calculated by the sales department.

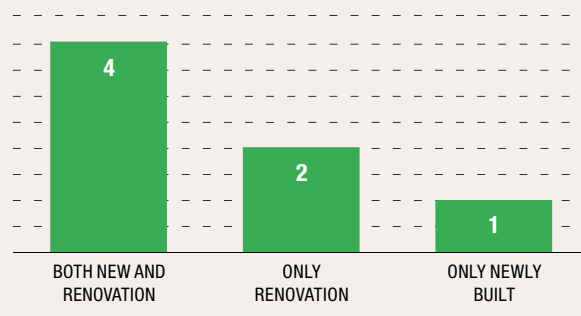


- Two organisations report deploying a specialised origination procedure but no further information is given.
- 60% (12 organisations) did not provide an answer.

**1.K)** Do your 'green' lending activities relate to: i) only new build properties; ii) existing (renovated) properties) or both? Please specify if any funding incentives are linked to 'green' retrofitting.

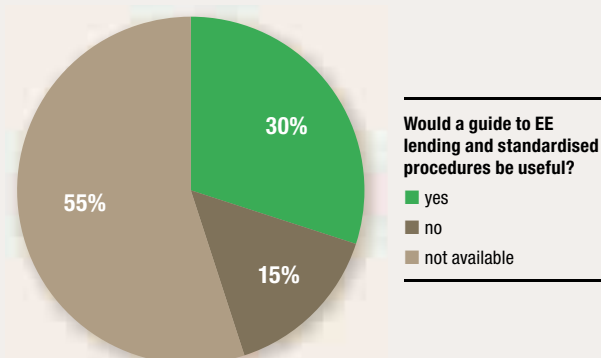
- Of those organisations (seven) which provided an answer, the majority (4 organisations) offer lending to both new build properties and existing (renovated) properties. Hereof, one organisation offers a discount if the building meets eligibility criteria or fulfils the obligatory minimum requirements.
- The remaining respondents (2 organisations) reported they only lend to existing (renovated) properties, related to renovation only.

'Green' lending related to:



- One respondent offered EE mortgages to only new build properties.
- 60% (12 organisations) did not provide an answer. One organisation answered "not relevant".

**1.L)** Would a guide to energy efficiency lending and standardised procedures be helpful to guide practices going forward? If yes, please specify what would be helpful to include in such a guide.



Amongst the nine organisations (45%) which provided an answer, there was a general agreement that a guide to energy efficiency lending would be useful. The following recommendations were given:

- A guide should help organisations install procedures in a standardised and convenient way;
- Such a guide should include criteria which help define the increased value of the asset and the earnings resulting from energy savings;
- It should include an overview and description of applicable contract types;

- It should include a standardised metric for energy efficiency assessment;
- It should include a list of the types of available certifications;
- It should include guidance on subsidies and tax easing where applicable.

Given that the market is still developing, the respondents also recommended striking a balance between providing helpful structures and limiting further innovations.

## MARKET RESEARCH & COMMUNICATION

**1. M)** Has your organisation conducted any market research related to 'green' mortgages/funding? Please summarise the result of the research and supply a reference if it is in the public domain.

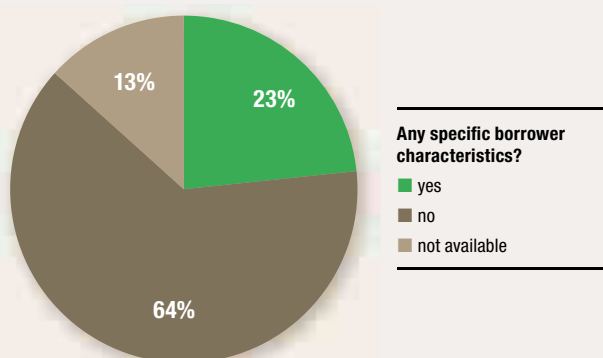
Due to potential anonymity issues, the information has not been included in this preliminary analysis.

- Seven organisations (23%) provided input.

**1. N)** Has your organisation observed specific borrower characteristics among borrowers of 'green' mortgages e.g. age, profession? Please specify the characteristics of the target group.

The seven organisations (23%) which had observed specific borrower characteristics reported the following observed target groups:

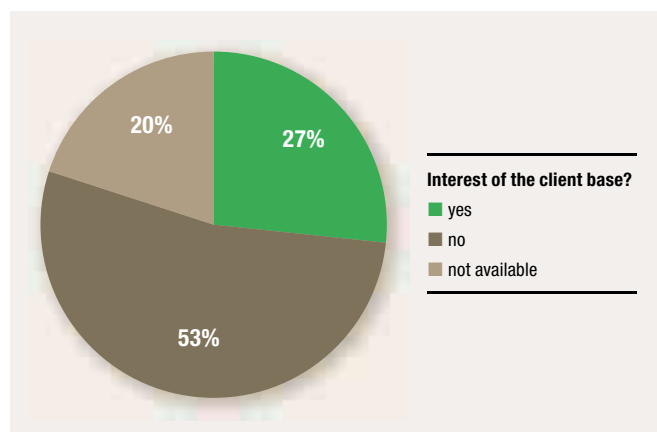
- Professional investment / publicly listed companies;
- Middle class / middle ages are most interested;
- Classic retail customers for new or re-construction or purchase;
- Farmers;
- Younger generations.



**1. O)** Within your organisation's client base, have consumers expressed an interest in 'green' finance due to energy efficiency being linked to increased health benefits and indoor climate of a property?

The respondents note that few consumers consider or enquire about benefits such as health or indoor climate when dealing with 'green' finance. One organisation notes that many environmental investments are related to the above-mentioned benefits, while another organisation reports expressed consumer interest in rehabilitation.

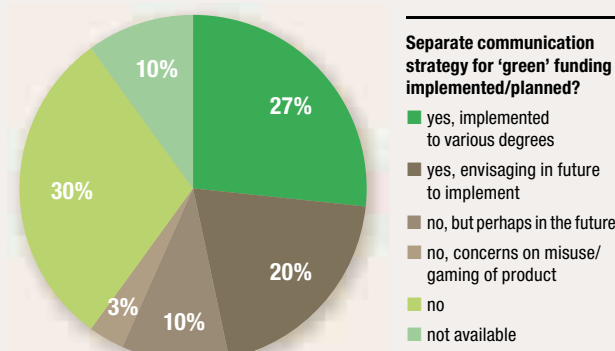
16 organisations (53%) note that no such interest has been expressed by consumers.



**1. P)** Does your organisation deploy, or envisage to deploy, a separate communication strategy for 'green' funding/mortgages?

27 organisations provide a response to this question. There is an overall interest in a communication strategy for 'green' funding/mortgages, as already eight organisations are providing to a various degree a separate communication strategy, while six organisations are positively inclined to develop one. Three organisations are more neutral and may consider opting for some action in the future if the market develops favourably.

Nine organisations neither have nor envisage implementing such a strategy. One organisation expresses concern about a separate strategy due to concerns over misuse/gaming of product.



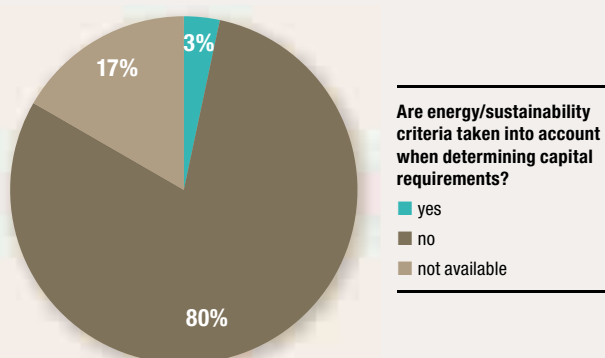
## PART II

# RISK MANAGEMENT/DATA AND VALUATION

### RISK MANAGEMENT

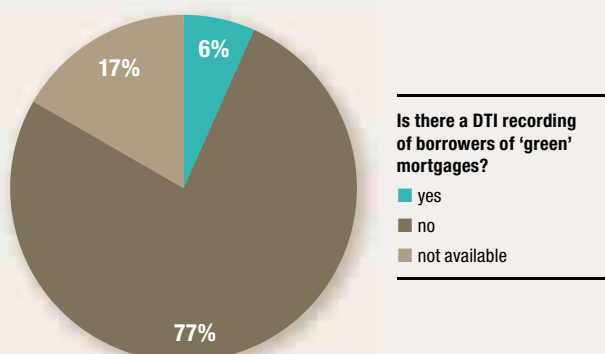
**2.A)** Do your organisation's credit risk calculation methods for the purposes of determining capital requirements (e.g. the Internal Ratings-Based Approach to credit risk (IRB)) include any energy/sustainability criteria? Please specify which criteria are included and how often these criteria are reviewed and by whom.

- One organisation reported "yes", noting that for specific categories of counterparties, however not for private individuals and mortgages, the risk assessment takes into account environmental factors when determining the credit standing. For corporate counterparties, environmental factors are considered in both the override process and in the internal rating model. Within the internal rating model, environmental factors are combined with other quantitative ones, attributing different weights in order to calculate the counterparty's PD. The renewal rating process is conducted annually as a minimum. Both the override process and qualitative environmental assessment may affect the risk profile.



- 80% (24 organisations) report that energy/sustainability criteria are not included in the risk calculation methods for the purposes of determining capital requirements.

**2. B)** Do your risk management processes allow for a recording of the debt-to-income ratio (DTI) of borrowers of 'green' mortgages? Please specify if any special assessment of this data has been employed.



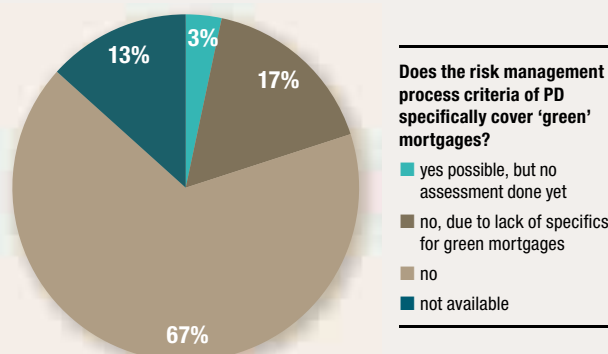
- 77% (23 organisations) report there is currently no differentiation made in the risk management processes and for the recording in the

systems according to whether the product is a 'green mortgage' or a 'conventional mortgage'.

Two organisations (7%) noted "yes". Of these two, one records the DTI of all new borrowers of 'green' mortgages at the time of origination. European DataWarehouse provides DTI information with an optional field in the ECB RMBS taxonomy.

**2.C)** Do your risk management processes allow for a recording of the probability of default (PD) of borrowers of 'green' mortgages? Please specify if any special assessment of this data has been carried out.

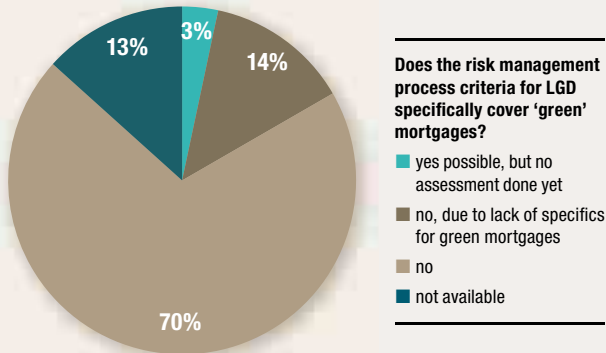
- One organisation is capable of recording the PD of borrowers of 'green' mortgage, but no assessments have been carried out at present.
- Several organisations reported that given the current lack in differentiation between 'green' and conventional mortgages the data is not available at present. However, the same organisations noted that if 'green' mortgages can be identified/tracked, recording the PD is possible.
- 20 organisations (67%) noted they cannot undertake such recording. However, one organisation noted that quantitative and qualitative risks are included in the risk-rating system, which can be different depending on whether the product is a 'green' mortgage or a conventional mortgage:
  - Example of a quantitative factor is a possible higher market value (and therefore a lower LTV due to higher sustainable rents) for 'green' mortgages.
  - Examples of qualitative factors are: 1) a better classification in case of energy-efficient construction, which improves the new lettings; or 2) that an energy renovation can lead to a better classification of the question of the sustainability of rents and prices.



**2.D)** Do your risk management processes allow for a recording of the loss-given-default (LGD) associated with 'green' mortgages? Please specify if any special assessment of this data has been carried out.

- 21 organisations (70%) note they cannot undertake such recording. However, one organisation notes that quantitative risks are

included in the risk-rating and which can be different, whether it is a 'green' mortgage or a conventional mortgage. Example of a quantitative factor is a possible higher market value (and therefore a lower LTV due to higher sustainable rents and higher recovery rates) for 'green' mortgages.



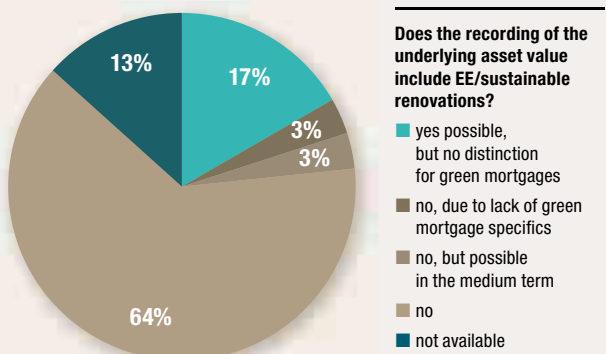
- Four organisations (13%) note they do not record the loss-given-default (LGD) associated with 'green' mortgages, but note that assuming a 'green' mortgage can be specifically marked / identified, the LGD would not be a problem.
- One organisation is capable of recording the LGD of borrowers of 'green' mortgages but no assessments have been carried out at present.

**2.E) Does your loan data allow for a recording of the (potential) increase in value of the underlying asset (by way of a property valuation) due to energy efficiency/ sustainable renovations?**

21 organisations (70%) replied "no" to this question. Hereof, one organisation writes that if the 'green' mortgage was specifically marked / identified, the increase of value traceability would not be a problem. Another organisation noted that such a recording may be possible over the medium term subject to a system development;

Those five organisations (17%) who provided a response regarding the recording of the (potential) increase in value of the underlying asset, noted the following:

- Several organisations noted that properties/ loan data are periodically revaluated taking into account their current value, which should include any renovation etc. but without distinction with regard to 'green' mortgages;
- One organisation noted that a sustainability analysis is made in relation to (farming) clients prior to granting a loan, which also effects the valuation;
- One organisation also notes that the original and current valuation amount of a property are mandatory fields of the ECB RMBS and SME template.

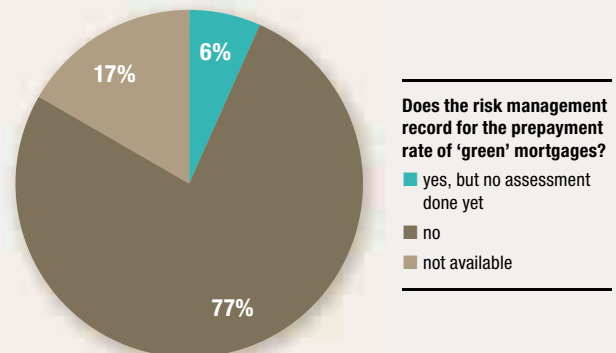


**2. F) If you answered YES to question 2.E, is the potential/actual increase in the value of the asset monitored throughout the life of the loan and adjusted in case conditions change, and if so how and by whom?**

- Two organisations (7%) answered "yes". These organisations conduct periodical property valuations.
- One organisation also reported that the original and current valuation amount of a property are mandatory fields of the ECB's RMBS template, noting that the current valuation amount is a dynamic field and should be changed in case there is an updated valuation amount.
- 87% (26 organisations) did not provide an answer.

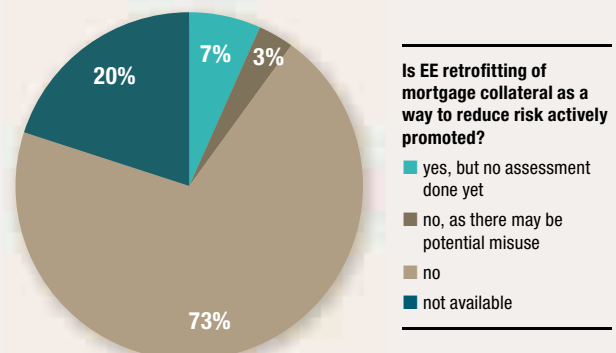
**2. G) Does your risk management system allow for a recording of the prepayment rate of 'green' mortgages? If yes, what is the prepayment rate of 'green' mortgages relative to conventional mortgages?**

- A vast majority (77%) of the organisations included in this survey cannot record the prepayment rate of a 'green' mortgage. One organisation notes that such a recording would be traceable if 'green' mortgages were specifically defined / marketed.



- Two organisations note that their data systems do allow for such a recording, but the data has not been subjected to any analysis at present.
- European DataWarehouse (ED): Data users can derive this information using ED loan level data.

**2. H) Does your organisation actively promote energy efficiency retrofitting of mortgage collateral as a way of reducing risk in your organisation's mortgage portfolio?**



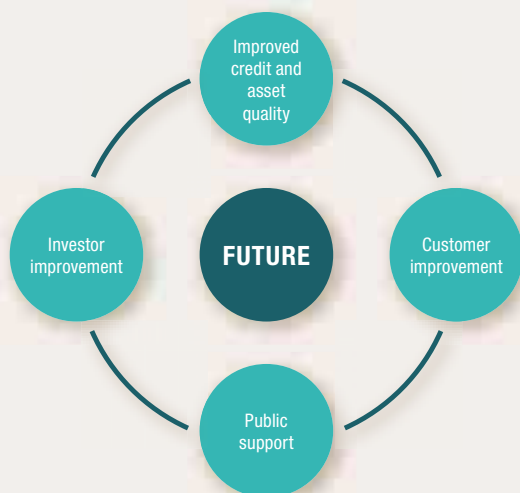
- Two organisations (7%) actively promote energy efficiency retrofitting of mortgage collateral as a way of reducing risk in their mortgage portfolio.

- A large majority (73%) of the organisations covered in this survey do not promote such retrofitting as a way of portfolio risk mitigation. One of these respondents agrees with the principle of risk reduction but is concerned about promoting such products due to potential misuse / gaming.

**2. I)** Please specify if there are any other reasons for the promotion of such loans by your organisation.

Provided answers referred back to Question 1B, where the following points were highlighted:

- 'Green' products are the future;
- Diversification of investor basis;
- Offer innovation and competitive products to customers to support their needs and strengthen the client relationship;
- Added value to investors;
- Improved credit and assets quality;
- Marketing measures;
- Energy savings;
- Development of local network;
- Regulatory driven and government support;
- Sustainability strategy;
- Social responsibility.



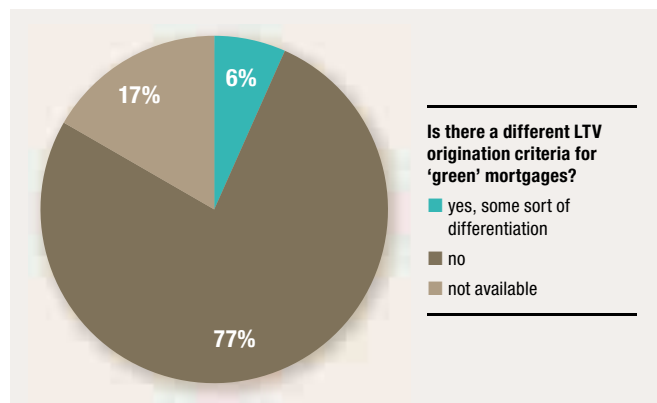
## PROPERTY VALUATION

**2. J)** Has your organisation adopted different Loan-To-Value (LTV) origination criteria for 'green' mortgages? If yes, please specify.

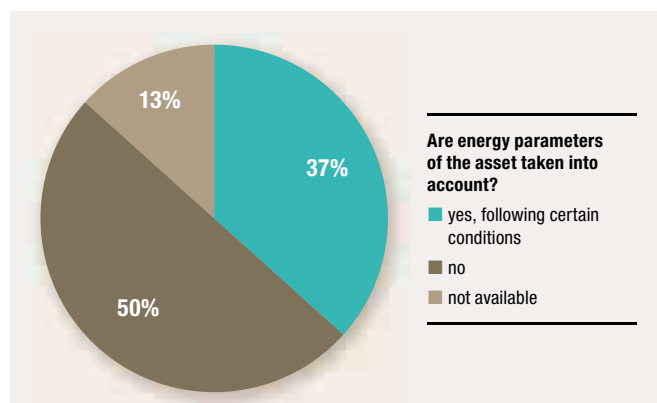
The general lending criteria and loan-to-value requirements are valid / employed for 'green' mortgages in 23 organisations (77%) covered in this survey.

On the contrary, two organisations noted the following:

- One organisation has for its 'green' product adopted a maximum loan-to-value origination criterion of up to 50% of the property value.
- European DataWarehouse (ED) provides 'original' and 'current loan-to-value' information. Data users can derive this information using ED loan level data.



**2. K)** Are energy parameters, such as the energy rating (i.e. EPC) of the asset, taken into account in the valuation of property for lending purposes?



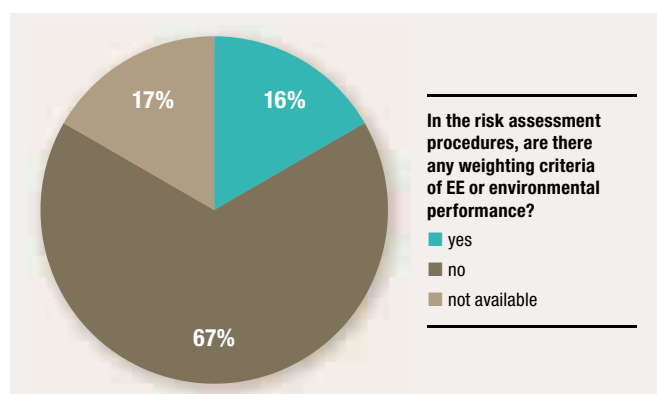
Half (50%) of the organisations responding reported that they do not at present take energy parameters directly into account in the valuation of property for lending purposes. They reported not being acquainted with the weighting of special parameters such as energy parameters and do not instruct valuers with guidance on the EPC rating.

A majority of the remaining respondents (37%) reported considering the energy rating / energy parameters either in general or when:

- It is available;
- It is considered to have an impact on the market;
- If ancillary rental costs are excessive.

\* One organisation noted that the UK government is sponsoring a project which will look at whether or not EPCs can be used to ensure more accurately modelled energy costs in an affordability calculator.

**2. L)** Do your property risk assessment procedures contain any weighting criteria of energy efficiency or environmental performance? Is yes, please describe these weighting criteria and how they are used.



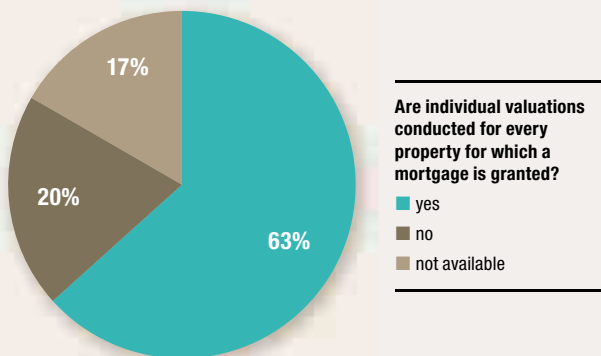
Over half (67%) of the respondents note that their property risk assessment procedures do not contain any weighting criteria of energy efficiency or environmental performance.

Amongst those who replied “yes”, the consideration of energy efficiency or environmental performance was undertaken in different ways:

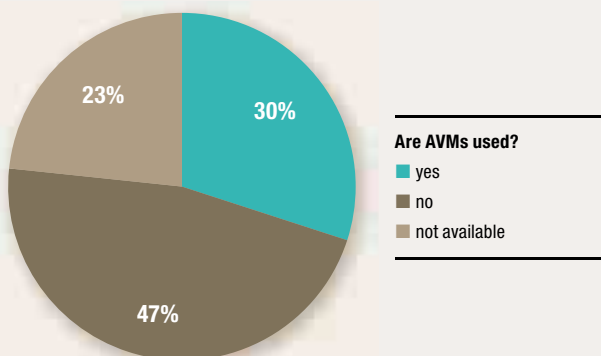
- Energy performance criteria are considered as soon as they have an impact on the market
- It is considered as properties with very poor energy performance are more difficult to sell and thereby riskier
- The added value of energy efficient buildings should be included in the procedures resulting in a lower loan-to-value
- Data comparison with non-green buildings in order to assess recoverable operating costs against non-recoverable operating costs with the result impacting the rent level of the two different building categories.

**2. M)** Does your organisation conduct/commission an individual valuation of each and every property for which a mortgage is granted?

63% (19 organisations) answered that a valuation assessment is carried out when a mortgage is granted. Some of the answers provide the following details: via an internal algorithm, automated or otherwise for all lending purchases/ re-mortgaging. One organisation noted that such an assessment was only carried out in the context of bridge loans; otherwise the actual purchase price was taken into account.



**2. N)** Does your organisation make use of Automated Valuation Models (AVMs)? Is yes, please specify if the AVM; gives consideration to energy/ sustainability features.



Nine organisations (30%) report using AVMs. Four out of these nine note the following considerations to energy / sustainability features:

- Energy efficiency is included in housing valuation by external entities

- AVMs include energy / sustainability features but are restricted to re-mortgage applications with LTV limits.
- Use of models in which some variables are linked to energy / sustainability, e.g. level of terminal isolation etc.
- Use of models which are supported by a system which respect high quality constructions.

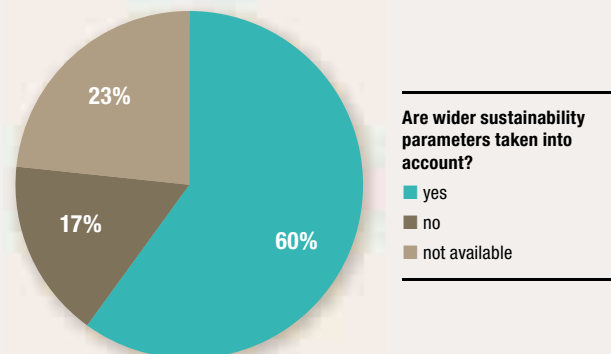
47% (14 organisations) reported no use of AVMs.

**2. O)** Are wider sustainability parameters, such as the location of the asset, flood risk, contamination or internal environmental quality (e.g. health quality) for occupants, taken into account in the property valuations?

60% (18 organisations) reported that sustainability parameters are taken into account in the property valuations either by the property appraiser or in an evaluation assessment. In this regard, it is noted that such parameters are considered when assessing the sustainability of a property, as the location of the asset, flood risk, contamination or internal environmental quality etc. are characteristics that effect marketability and hence impact the value.

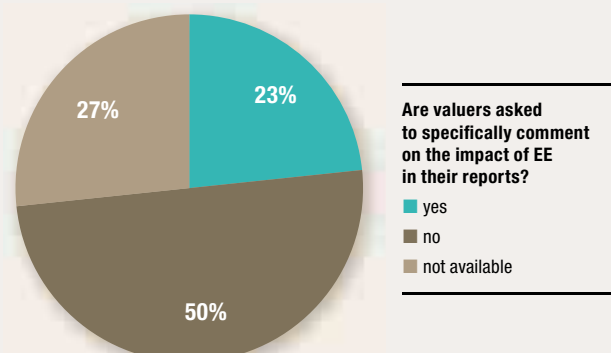
One organisation also reports taking seismic risk into account in its evaluation.

17% (five organisations) report not taking wider sustainability parameters into account.



**2. P)** Does your organisation ask valuers to specifically comment on the impact of energy efficiency in their valuation reports?

23% (seven organisations) noted that energy / energy efficiency impacts are specifically commented on. Examples of how include mandatory energy screening and / or valuation standard requirements. For example, in the Netherlands there are currently discussions on whether or not to include sustainable elements in the appraisal reports for commercial real estate.



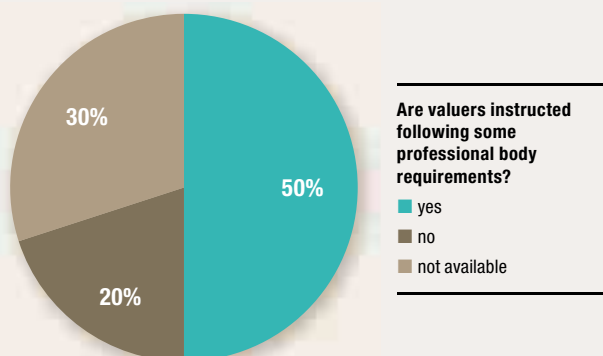
10% of the 15 organisations which reported they did not ask valuers to specifically comment on the impact of energy efficiency noted the following:

- Internal discussions were ongoing on whether or not to do so.
- Cooperation with appraisers which take into account energy efficiency is done for a minor part.
- Such features will be required later in the year as part of the work done to improve valuation reporting.

**2. Q)** Are valuers instructed in accordance with professional body requirements, such as RICS' Red Book and TEGOVA's European Valuation Standards (EVS)? If yes, please specify which.

50% (15 organisations) reported that valuers are instructed in accordance with professional body requirements. Reference were made to the following standards:

- Gudrun
- TEGOVA
- RICS (Red Book)
- Danish FSA guidelines and internal lender requirements
- Valuation standards are issued in compliance with EVS standards
- CRIF uses valuers who are either or both TEGOVA and RICS certified
- In the Netherlands a national standardised model is used for appraisals conducted by real estate agents and valuation agencies (SCVM: Stichting Certificering Voor Makelaars en taxateurs)
- Italian Banking Association
- UNI 11588: Appraiser real estate
- Beleihungswertermittlung VO - BelWertV



One organisation noted that the RICS and TEGOVA certifications are not a hard requirement.

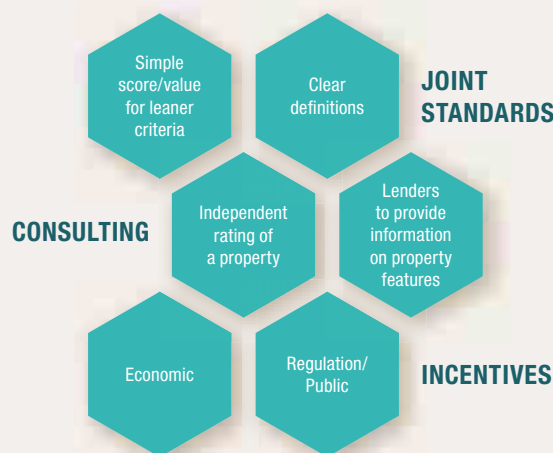
**2. R)** How do you envisage the best coordination between lenders and valuers in relation to the assessment of the value of sustainability features of properties and subsequent articulation in valuation reports?

The 15 organisations (50%) which provided an answer to this question made the following suggestions:

- Joint standards with clearly defined substantial performance metrics recognised and adopted by a substantial number of institutions;
- Consulting between credit management and internal valuers of the bank;

- Lenders need to provide information on substantial property features (e.g. green building certificates and ETC etc.) and energy performance should be incorporated in the valuation report;
- Requirements for sustainable properties should be incorporated into mortgage lending practise.
- Economic incentives in the lending process to pursue coordination;
- Via professional valuation bodies;
- Dedicated standards, contextual agreements and a dedicated control system;
- If a property benefits from added-value features, this should be captured by valuers;
- Valuers' evaluation on whether or not the sustainability features enhance the overall property value;
- The requirements for sustainable property should be incorporated into regulation;
- Continued independent rating of properties is essential;
- Sustainability of the measures taken over the life time of the loan
- A majority of the valuers used by banks are certified via a process set up by the banks;
- A simple score/value has to be taken into account to accept leaner criteria.

One organisation noted that better coordination was not applicable as valuation does not detail the weight of specific parameters.



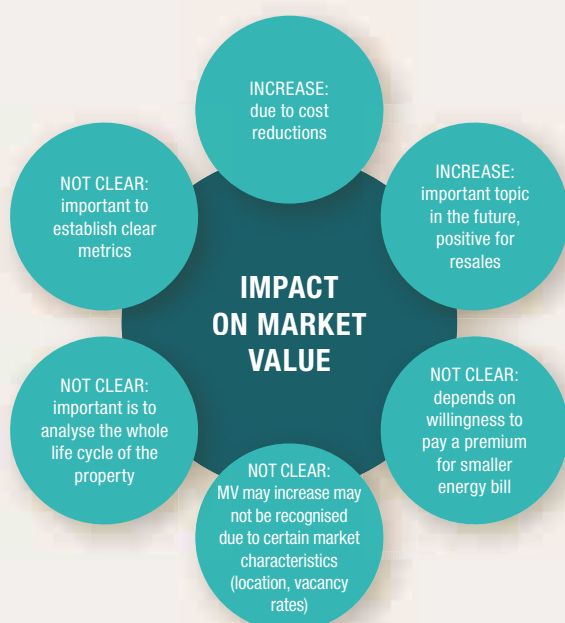
**2. S)** In your opinion/experience what impact does low energy demand / consumption have on the value of a property? How do you determine this?

43% (13 organisations) provided some input on the impact of low energy demand / consumption on the value of a property. The bullet-points below provide a picture of the opinions/experience expressed under this question:

- Low energy consumption is increasing the market value in general
- Market value is increasingly being determined by the energy demand of a property, but no parameter has been incorporated within the mortgage application process
- Its importance will increase as savings on energy costs increase customers' ability to repay their loans. In practice this means that a mortgage with an underlying energy efficient collateral

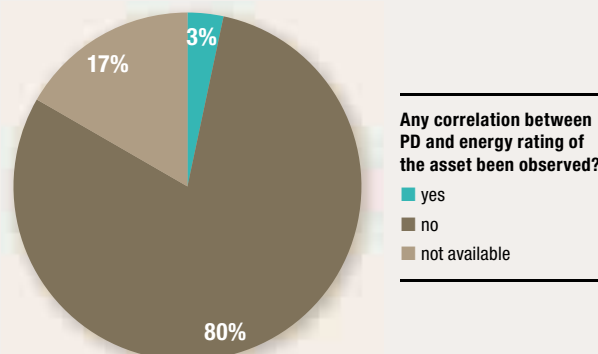
has a more stable performance compared to a mortgage with underlying high energy costs

- There is little evidence of low energy performance impacting property values, but the importance of energy efficiency is becoming increasingly important with consumers so more data is likely to follow. However, unless the sustainability of the measures can be guaranteed for the life time of the loan term, then there would be little if any benefits to factor this into the value of the property
- Based on actual behaviour of market practices, an expert stresses that the number of energy efficient properties will increase in the future and therefore the resale will be advantageous.
- The impact depends on whether or not the purchasers are willing to pay a premium for lower energy demand / consumption features
- Lower energy consumption costs result in lower total housing costs. Internal experience shows the reduced costs being capitalised through a higher value of the property
- At present energy efficiency is not normally a main priority, but as costs increase and buyers become more aware of energy performance this will have a greater impact
- The impact is translating into an increase of the market value, although depending on the specific market characteristics this benefit may not be recognised at all by the market, therefore being null
- Low energy cannot be valued separately and has to be seen in the context of maintenance effort and the disposal of materials during the life circle of the property
- The only measurement to establish the impact is market demand
- Establishing the impact requires establishing energy efficiency metrics as soon as possible, as the gap between inefficient and efficient properties is likely to increase over the long-term
- Such impact is currently limited and mainly focused on location
- In areas with high vacancy rates and low prices the energy performance can have a significant impact. However, restricted market transparency and evidence makes the impact difficult to determine. To compensate, the market evidence is therefore, sometimes, replaced by estimations based on the experience of the valuer.



**2. T)** Has any correlation between Probability of Default (PD) and the energy rating of the asset been observed in your data? If yes, please specify what kind of model was employed to determine this.

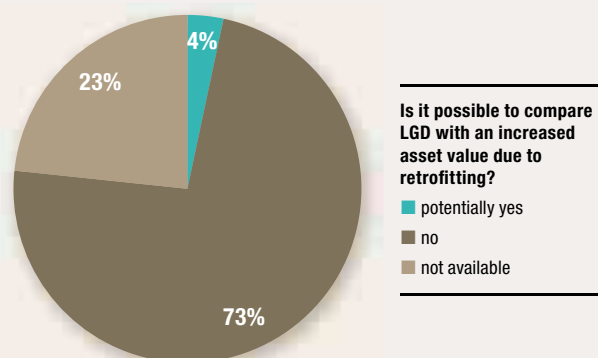
80% (24 organisations) of the respondents reported that no such correlation can be observed. Out of these, 8% emphasised that such a correlation had not yet been established.



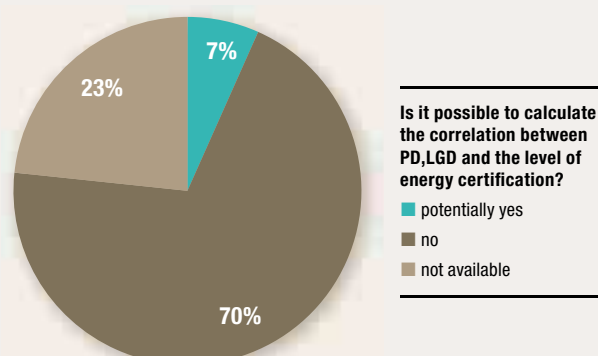
## DATA

**2. U)** Does your loan data allow for a comparison of the Loss Given Default (LGD) and increased asset value due to retrofitting? Both in terms of origination and asset management.

- 73% note that such a comparison was not traceable, despite the LGD being affected by the property value and thereby in theory also by retrofitting.
- One organisation also noted that such a comparison could potentially be traceable.



**2. V)** Does your loan data allow for the calculation of the correlation between PD and LGD of 'green' mortgages? Both in terms of origination and asset management?



- 70% (21 organisations) replied that no such correlation was allowed within their loan data.
- Two organisations (7%) answering “no” add that a calculation of the correlation has not yet been analysed, and assuming ‘green’ mortgages can be identified, there will be a lack of data in default to carry out such an analysis.
- One organisation notes that such a comparison could potentially be traceable.

**2. W)** If you answered YES to the question 2.T, can parallels be drawn between the PD and LGD correlation and the EPC/energy level certification?

- 90% (27 organisations) did not provide an answer to this questions.
- One organisation reported undertaking a test on the parallels between the PD and LGD correlation and the EPC/energy level certification.

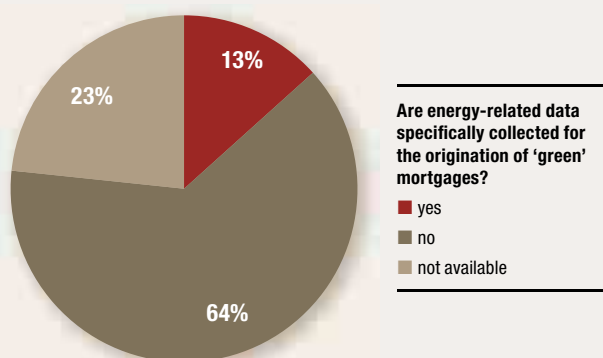


# PART III

## ENERGY EFFICIENCY MEASUREMENT & INTERNAL PROCEDURES

**3. A)** Does your organisation specifically collect energy-related data for the purposes of origination of a 'green mortgage'?

- 13% (four organisations) replied that they specifically collect energy-related data for the purposes of origination of a 'green mortgage'.
- 63% (19 organisations) replied they did not, out of which one organisation notes they do not collect such data as this is not provided in the EPC label information.



**3.B)** What energy-related data does your organisation require for the purposes of 'green' mortgage origination? Energy consumption-related, energy demand-related, both, or other? Please specify what data is collected (e.g. EPC, utility bills, smart meters etc.?), when it is collected and from what source (e.g. consumer, external provider etc.).

The 13% (four organisations) which provided an answer, specified the following:

- The annual primary energy consumption has to be verified for each sustainable loan by an energy consultant. The energy consumption is collected and followed up for each loan and each object. Both information is required: energy consumption-related and energy demand-related data. The verification has to be confirmed before payment by the building company, by an expert or by the architect.
- The energy consumption and demand data is taken into account with a preference for the latter. Data are taken out of the EPC. In more detail: energy performance is KWh /heating and warm water), data of issuance, data of expiry, country. Energy Efficiency related data from sustainability certifications.
- Primary energy demand based on EPC, which is based on building permit data (as these need to follow certain minimum Energy Performance Coefficient Scores)
- The energy audit is the process which collects all energy data: actual primary energy consumptions (electricity, natural gas, other fuels) from meters, energy use (hot/cold water for heating and sanitary water, hot/cold air), degree days (winter + summer), building characteristics, building occupancy, list of energy equipment, building usage, energy modelling, etc. A key aspect are the time intervals at which measurements are available.

**3. C)** In which format is any technical data collected/available? Could the data be used for statistical purposes?

Those 13% (same four organisations as those who provide an answer to 3.B) who provided an answer, specified the following:

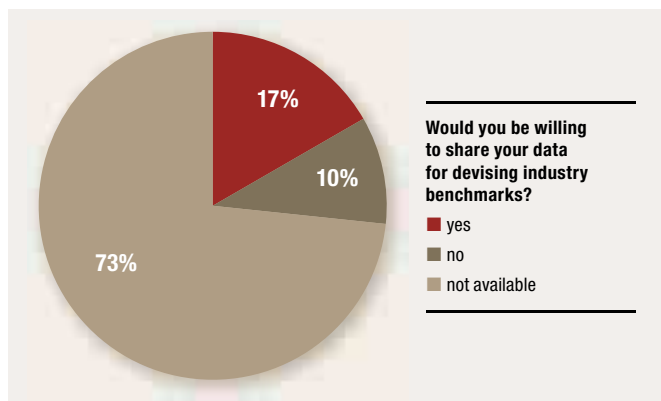
- Excel files. Data are also used for benchmarking.
- Selected mortgages are verified and database enriched via an external part for mortgages. For commercial real estate it is based on EPC. Data cannot easily be used for statistical purposes.
- Data is available and could be provided in both excel, richtext, html, txt.
- Confirmation of data is provided by an energy consultant or via the energy pass (EneV). The data is available per loan and per object in the system.

**3. D)** Which data, if any, concerning energy does your organisation record in its loan monitoring systems? And what use is made of the data?

- 80% (24 organisations) did not provide an answer.
- 13% (four organisations) noted that some data is recorded in related procedures. The following specifics were provided:
  - The annual primary energy demand (kWh/m²) is collected, the energetic quality of the building envelopes (U-Wert) and if available the carbon emission value. This data can be analysed situationally;
  - Energy performance in KWh (heating and warm water) is recorded. This data is used to assess whether the building is an eligible green building and to compare it against benchmarks for impact measuring;
  - Building permit data for new builds is used for mortgages. For commercial real estate EPC, External Certification (Breeam etc.) and for renovation the perceptual improvement of primary energy consumption (based on an expert report);
  - Data are used for energy performance contract requirements.

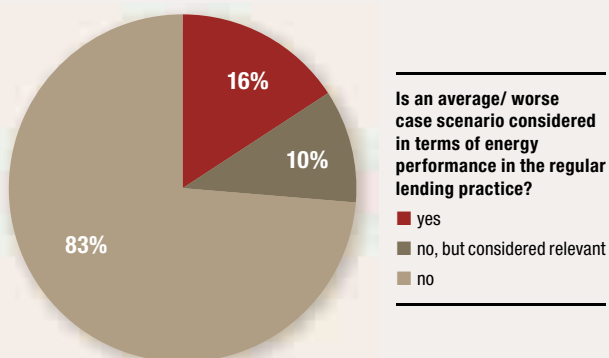
**3. E)** Would you be willing for any data you collect to be used for the purpose of devising industry benchmarks?

- 17% (five organisations) are willing to share their data for the purpose of devising industry benchmarks. One of those organisations added, however, that while they are interested in sharing data and devising industry benchmarks, their data is not significant enough to create a track record.
- 10% (3 organisations) are not willing to share their data. Hereof, one organisation noted that they do not envisage the need for industry benchmarks.



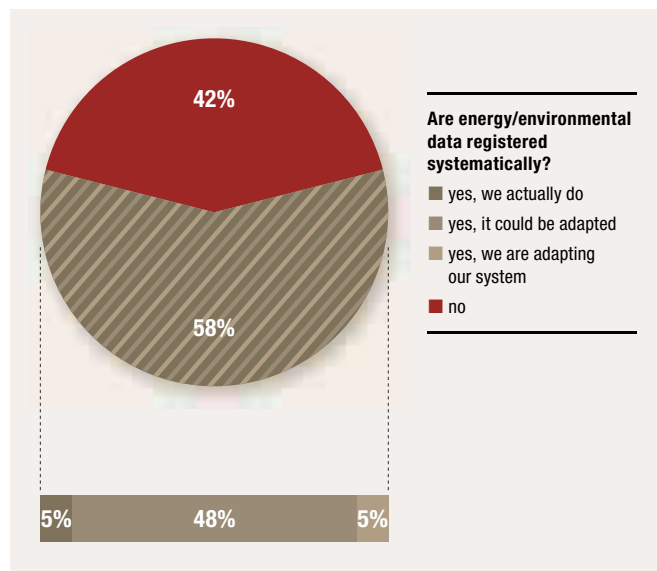
**3. F)** If you answered NO to question 3.A, does your organisation assume an average or worst case scenario in terms of energy performance within regular lending practice?

- Amongst the 16% (three organisations) which answered “yes” to this question (3.F), the following input was gathered:
  - Average scenario assumed;
  - The energy performance of each specific property is considered within the valuation and its risk profile. Properties with low energy performance will be treated with a higher risk profile, which also affects lending;
  - Energy costs are modelled on national averages using the Office of National Statistics’ family spending report.
- Two out of the 16 organisations (84%) which answered “no” to this question (3.F) added that an average / worst case scenario or assessments of energy performance is considered relevant / analysed with regular lending practices.



**3. G)** If you answered NO to question 3.A, is your organisation’s loan monitoring system capable of allowing such (energy/environmental) data to be registered systematically? If it is not, could it be adapted to allow for the registration of such data?

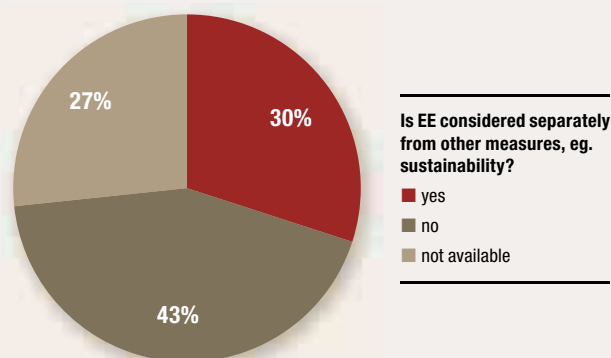
58% (11 organisations) noted that their systems could be adapted to allow the registration of such data. Of these, one organisation does collect and register data automatically and systematically, and another organisation is looking to adapt their system to allow the registration of such data but likely only from new mortgages.



**3. H)** Is ‘energy efficiency’ specifically, i.e. separate from sustainability, considered internally within your organisation?

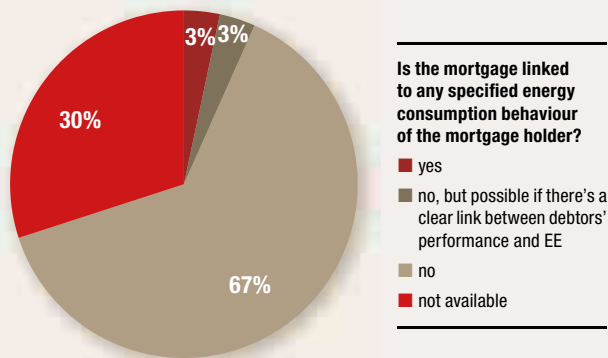
30% (nine organisations) noted that ‘energy efficiency’ is considered internally within their organisations. The following input was added by these respondents:

- Energy efficiency is promoted within the sustainability business and is looked at as a governance process but it is separated in terms of market practice;
- From an ESCo perspective, sustainability always refers to the solidity of energy efficiency improvement over time;
- Energy efficiency is specifically considered as only energy efficiency mortgage loans are originated;
- Energy efficiency is a generic item only considered within the sustainability framework due to a lack of criteria harmonisation and lack of data;
- Research on the topic is being undertaken. A discount on residential mortgages is provided for new builds built in the most energy efficient way;
- Sustainability is firmly anchored within the business model. All sustainability activities are reported in the sustainability report and oekom research is considering all details in the sustainability rating.

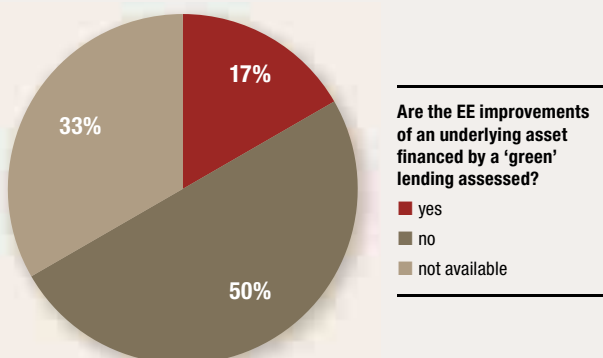


**3. I) Is the mortgage linked to any specified energy behaviour on an ongoing basis? E.g. can even more funds be granted if the borrower's behaviour results in a further reductions of actual energy usage?**

- A majority (67% - 20 organisations) answer that behaviour is not included in the mortgage requirements. One organisation added that if debtors' performance could be visibly linked to energy efficiency, then the behaviour could be linked to the mortgage in a systematic approach.
- One organisation reports that specified energy behaviour can be linked to the mortgages.

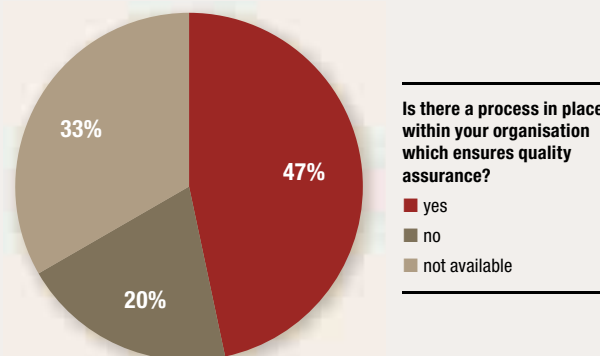


**3. J) Does your organisation assess the improvement in energy efficiency (i.e. energy savings) of an underlying asset which has been financed by a 'green' lending? If yes, what do you accept as evidence.**



- 50% (15 organisations) noted that no such assessment is carried out.
- The 17% (5 organisations) who answered "yes" noted the following:
  - The premise is always the performance of the minimum requirements regarding the annual primary energy consumption;
  - Financed assets are constantly measured, monitored and reported through energy performance indicators;
  - If during the financing period substantial building improvement in terms of energy efficiency is undertaken, a new/updated valuation would be required. Updated EPCs would be accepted as evidence;
  - Only in cases of commercial real estate currently. This is based on an expert report or an official EPC calculation.

**3. K) Is there a process in place within your organisation which ensures quality assurance, i.e. that only reliable and trustworthy data is entered into the data base?**



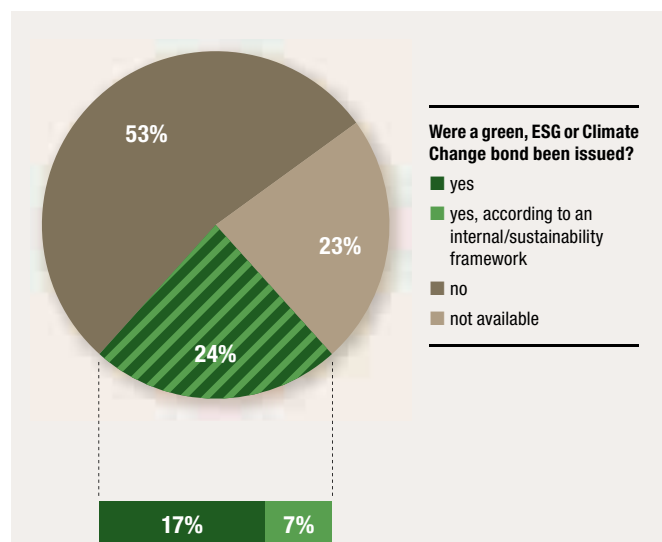
47% (14 organisations) reported that some quality assurance process is in place. Below are some examples of how quality assurance is implemented by these organisations:

- Quality confirmation is only accepted from officially recognised and appropriately qualified third parties (e.g. energy consultant, architect);
- General quality management;
- A special process is set up to ensure that only reliable and trustworthy data is entered into the database. The valuation department analyses the energy efficiency of the financed building and documents the information in the expertise. The expertise provides a first indication on whether or not the financed building could qualify as a green building. Subsequently, the treasury department makes sure that the energy efficiency of the financed building in the expertise matches the internal criteria. Finally, the treasury department double-checks whether or not the financed building qualifies as a green building. After this decision process, the data is entered into the database.
- Constant work is done to improve the reliability and consistency of the database. For the green bond selection, the data is checked together with an external consultant. An independent auditor reviewed by KPMG is provided with a limited assurance on the use of proceeds being in line with the eligibility criteria of the green bond.
- A specific process of data quality aiming at constructing, maintaining and developing company information heritage according to standard levels in terms of accuracy, consistency, completeness, lack of deterioration, timeliness and uniqueness is implemented internally. The process consists of: identifying and measuring anomalies, fixing acceptable measure ranges, and activating corrective and preventive actions to achieve/maintain satisfactory data quality levels by means of a continuing improvement cycle.
- Use of certification standards (e.g. ISO 9001, ISO 50001 and UNI CEI 11352 (ESCo Certification)).
- European DataWarehouse has a quality management process to ensure the submission of high quality data in the platform. There are also in place specific checks in the database during the upload process for compliance with the ECB ABS templates and internal minimum quality requirements.

## PART IV

# GREEN RATING AGENCIES & BONDS

**4. A)** Has your organisation issued a green or Environmental, Social & Governance (ESG) or Climate Change bond? If yes, in which format (senior vs. covered) and which assets were placed in the bond?



- 53% (16 organisations) reported not having issued such bonds.
- On the other hand, 23% (seven organisations) reported past experience with issuing bonds with green or Environmental, Social & Governance (ESG) or Climate Change bond classifications. Within the input provided, both covered and unsecured bonds had been issued and the issuances were all fairly new (within the last few years). Two of the seven organisations also reported that the issuance was done according to an underpinning internal green/sustainability framework.
- European DataWarehouse hosted the first green RMBS transaction in Europe with specific loan level data submissions.

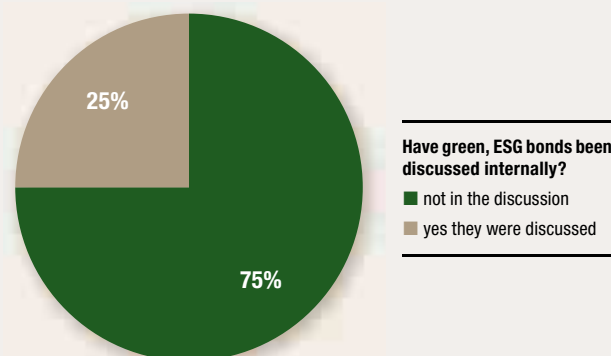
Regarding the included assets, the seven organisations report the following: 'green' mortgages, 'green' buildings, 'green' commercial real estate, solar panels on residential housing, transformations, renovations, upgrades of commercial real estate, renewable energies, environmental aspect, energy efficiency, mass and public transportation, water management and treatment, recycling and social aspects including socially responsible rental structures, permanent right of residence for tenants, housing cooperatives and no speculation with vacancies combined with some ecological criteria like investments in modernisation or energetic activities.

**4. B)** If you answered NO to question 4.A, has the future issuance of green or ESG bonds been discussed internally in your organisation? If yes, what are the main barriers for your organisation to issue green or ESG bonds?

12 organisations (representing 75%) reported having had internal discussions and considerations of future issuances of green or ESG bonds and highlighted the barriers noted below:

- Size of company too small to enter;

- Identification of eligible loans;
- Additional internal and external costs;
- Lack of pricing / cost advantage;
- Lack of legal definitions for 'green' mortgages and green bonds;
- Only one cover pool can exist under the current law;
- Setting up relevant green framework and data quality;
- Cost efficiency;
- Behaviour of the agent and the customer;
- Low sensibility;
- The green bond market is still a quite young market;
- There is not yet a definition of 'green' that can be applied to all sectors and asset classes;
- Best practice in disclosing the ecological impact of the investment needs to be established
- Sceptical about investor appetite for green covered bonds with limited evidence of new investors looking to enter this asset class;
- Concern about potentially creating two types of loans within the covered bond portfolio as there is a risk that investors will compare the two classes, potentially leading investors to conclude that one is less secure than the other.



**4. C)** Does your organisation have an externally assessed 'green' or 'sustainable' framework which includes energy efficiency as a specific factor when issuing debt instruments?

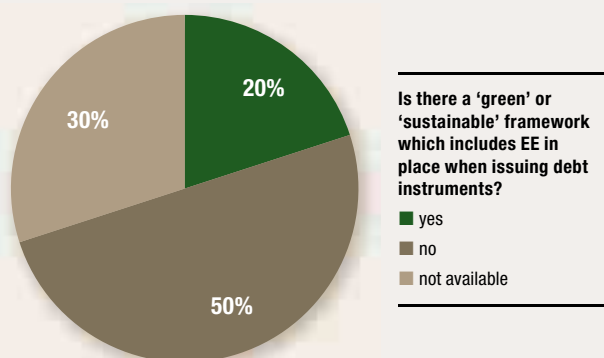
20% (six organisations) reported that they have a 'green' or 'sustainable' framework.

Among the answers provided, the following details were specified:

- Framework identifies sectors with a positive impact on the environment, including energy efficiency;
- oekom has been used as second opinion provider
- Assurance provided by an external auditor (KPMG, EY);

- Climate Bond Initiative certified the bond as being in line with their real estate criteria.

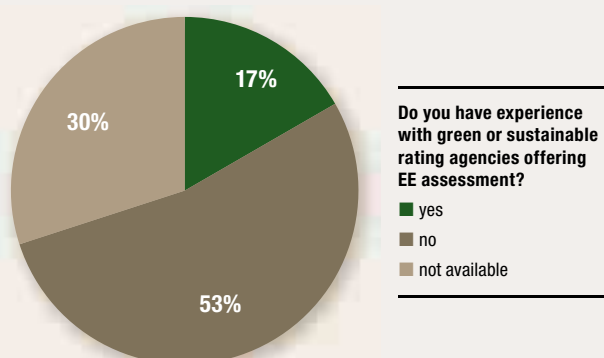
50% (15 organisations) noted not having an externally assessed 'green' or 'sustainable' framework.



**4. D)** Do you know of or do you have experience with green or sustainable rating agencies which offer the service of energy efficiency assessment of bank's existing portfolios? If yes, please explain.

17% (five organisations) reported knowledge of or experiences with green or sustainable rating agencies. The following specifics were given:

- oekom, MSCI ESG and Vigeo Eiris can assess the overall sustainability performance of 'green' portfolios.
- South Pole Group and yourSRI offer climate and energy efficiency assessments.
- Most extra-financial rating agencies offering second-party opinions on green bonds would be able to offer this service.

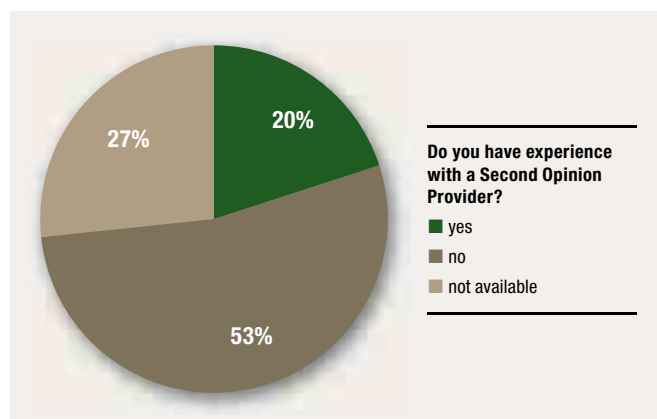


**4. E)** Has your organisation had contact or experience with a Second Opinion Provider when issuing a green or ESG bond etc.? If so, please specify which provider.

Organisations which reported having had contact with or knowledge of Second Opinion Provider provided the following details:

- oekom provides the Second Opinion in most instances with some of them available online;
- Sustainability has also provided second opinions.

53% (16 organisations) noted not having had contact / experience with a Second Opinion Provider.



**4. F)** If you answered YES to question 4.E, what were the findings of the Second Opinion Provider concerning your organisation's green building portfolio? Please highlight if the Second Opinion Provider specified requirements concerning green/energy efficient buildings?

Of the six organisations which answered "yes" to 4.E, some provided links to publicly available green bonds programme information and Second Opinion Provider reports. In addition, one organisation noted that ecological aspects were highlighted in the opinion, whereas another respondent noted that products / technologies that reduce energy consumption should be included in the framework.

77% (23 organisations) did not provide an answer to this question.

# PART V

## GREEN INVESTMENTS

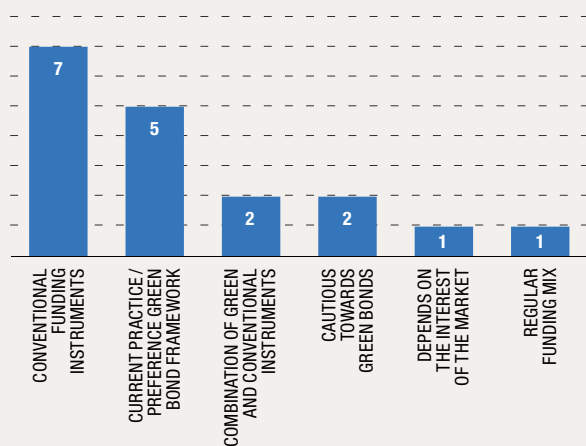
### ISSUER PERSPECTIVE

**5. A)** How does your organisation fund, or envisage to fund, green and/or energy efficient mortgages? Please specify either green or conventional funding instruments.

The 60% (18 organisations) which answered this question provided a variety of answers:

- Seven organisations fund or envisage to fund 'green' mortgages via conventional funding instruments. Within this group, one organisation noted it would not rule out the possibility of future 'green' funding.
- Five organisations emphasised current practices or a preference for funding under a green bond framework.
- One organisation noted that the choice of funding would depend on interest expressed by the market.
- Some organisations expressed a cautious approach towards issuing (green) bonds due to their business model.
- One organisation mentioned the use of a regular funding mix.
- Two organisations expressed a possibility on combining the two, i.e. green and conventional funding instruments.

Which plans to fund green and/or EE mortgages?

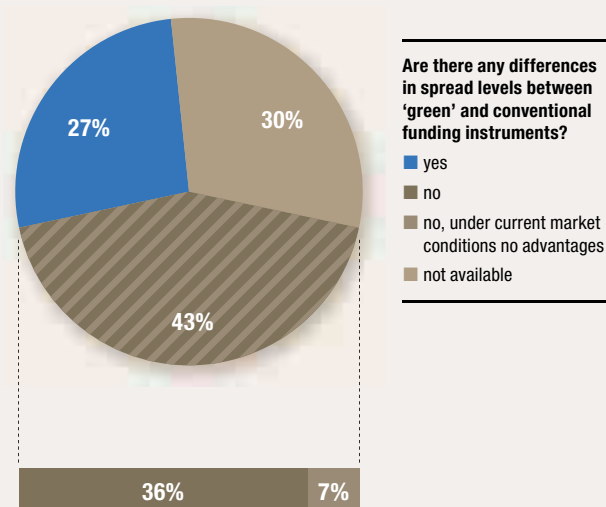


**5. B)** Has your organisation observed any differences in spread levels between 'green' and conventional funding instruments.

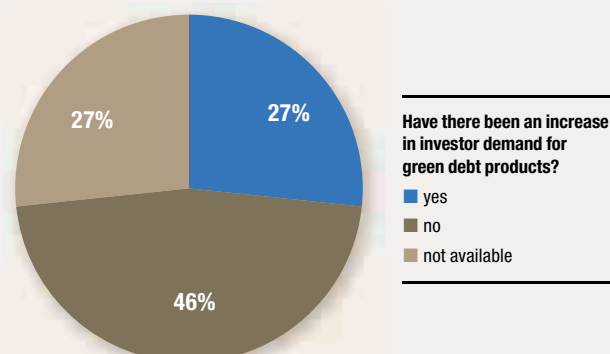
- Eight organisations (27%) responded "yes" to this question adding the following information:
  - Yes, but not a material difference;
  - The senior green bond is priced inside its outstanding senior secondary curve;
  - Green senior unsecured has been issued with a NIP of only 2bp. In addition, it has performed 17bp since issuance;
  - A trend towards lower cost of funding from sustainable issues compared to regular ones;

- Difference in new-issue premium of 3-5bp. Secondary spread performance was significant (approx. 10bp of first green bond vs. the regular bond). The second bond priced through its secondary curve and in between fair value and the outstanding green bond. Recently there has been a minimal secondary pricing differential if at all due to spread compression of the total curve.

- 13 organisations (43%) reported that no differences in spread levels had been observed. Within this group, two organisations added that under the current market conditions, there are no economic advantages from a bank's perspective in issuing green bonds or covered green bonds compared to conventional funding instruments.



**5. C)** Has your organisation experienced an increase in investor demand for green debt products? If yes, how has this demand been measured? From which type of investors does this demand emanate and against which asset type (s) is it prevalent?



27% of respondents responded "yes" and highlighted the following:

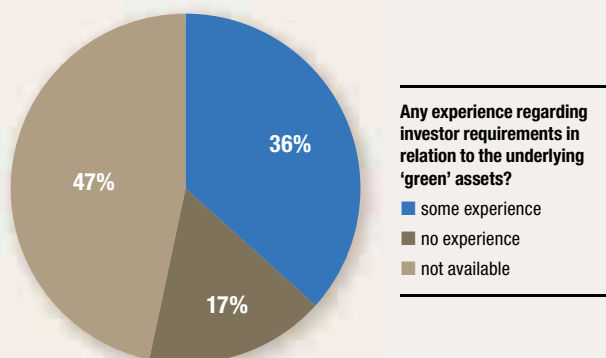
- Wealthy investors are increasingly interested.
- A majority noted that green products attract many new investors.
- There is an increasingly large and diversified set of investors aware of reputational factors.

- Institutional investors (both asset managers and asset owners) have intensified the creation of SRI (Socially Responsible Investment) funds that follow ESG (Environmental Social Governance) criteria. According to Global Sustainable Investment Alliance, USD 21.4 trillion have been invested under ESG criteria as per year-end 2014 (this is a bi-annual review – the next publication is planned for Q1 2017). Globally, every third dollar (30.2%) is invested under ESG considerations, an increase of 50% versus 2012 (source: Global Sustainable Investment Review 2014). Green debt products, mainly labelled green bonds are a signalling mechanism for investors to identify climate-aligned investments.
- SRI investors have expressed some interest in sustainability in general, dedicated green bond investors are investors who reserve specific funds to green bond investments only.
- Green bonds benefitted from a very strong interest expressed from green investors.
- More questions and interest regarding green bonds are received from potential investors.
- Higher focus on CSR/ESG in general also from the authorities and different organisations.
- One organisation noted that one-third of their new investors have a clear sustainable focus, whereas others (including asset managers with a sustainable mandate) consider ESG covered bonds too expensive.
- One organisation noted that ESG products in general are more demanded by the retail base.
- One organisation reported a trend towards lower cost of funding for sustainable issues compared to regular ones – highlighting, however, that such a trend may be difficult to determine.

14 organisations (47%) reported that no increase in investor demand for green debt products had been observed.

#### 5. D) What is your organisation's experience of investor requirements in relation to the underlying 'green' assets?

- Five organisations (17%) reported no experience with such investor requirements.
- 11 organisations (37%) reported some level of experience with investor requirements in relation to the underlying 'green' assets.

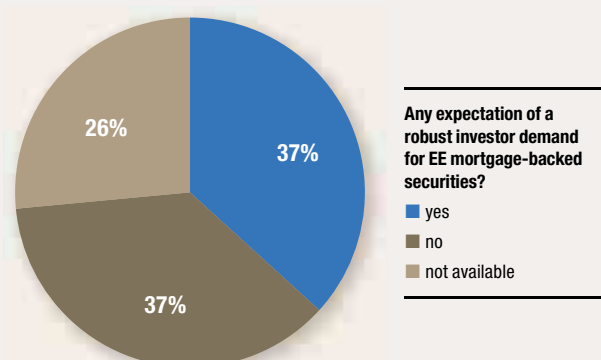


Among the answers provided, the following points are worth noting:

- A majority noted that investors require a high level of transparency, both in relation to the criteria, allocation and what is green.
- One organisation noted that energy efficiency is by far the most important factor to consider.

- In general, it was noted that investors require state-of-the-art impact reporting and transparency regarding how the environmental impact is measured.
- One organisation noted that investors require knowledge about the environmental and/or climate relevance of the project categories. The credibility and consistency of the external review and the annual reporting on use and management of proceeds were considered important.
- Sustainability quality of the issuer.
- One organisation noted that there is no common language within the market segment. There are a lot of questions and the approach to/ analysis of sustainability is very heterogeneous.

#### 5. E) Do you anticipate robust investor demand for energy efficient mortgage-backed securities, such as RMBS or Covered Bonds?



- 37% (11 organisations) anticipate a robust investor demand for 'green' investment possibilities. The following arguments are worth highlighting:

- Robust investor demand is anticipated as demand for 'green' investment possibilities continues to proportionally outpace the supply. The growing number of SRI/ESG funds will drive demand even further.
- In general, a robust demand is anticipated, however, the low interest rate environment and the ECB asset purchase programmes are limiting factors.
- Very positive responses have been received for green bonds related to energy efficient real estate. A similar reaction could be expected for RMBS or covered bonds.
- The green bond market has developed into a variety of debt instruments, including RMBS and covered bonds, and there is growing investor interest outside of senior bonds.
- Yes, based on existing experience with sustainable bonds.
- One organisation anticipated a likely increase of investor demand in the medium and long-term.

- On the other hand, 37% (11 organisations) do not anticipate an increased investor demand, due to the following reasons, among others:

- Not enough issuance volume until today to decide but the market will grow further.
- Compared to traditional covered bonds – in the long run – no increased demand is anticipated.
- Material new interest is not expected in 'green' secured funding, but rather the potential for some existing investor interest to be recycled into such product.

## INVESTOR PERSPECTIVE

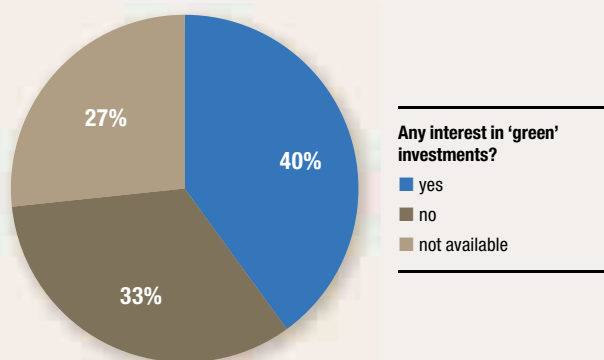
**5. F)** Does your organisation have an interest in 'green' investments? If yes, what do you think is driving this interest? Is this view based on any market research?

12 organisations (40%) reported having an interest in 'green' investments.

The following reasons/ drivers were added:

- Interest based on client demand and organisational focus / sustainable ambitions.
- Some exclusion criteria are in place as part of an overall company sustainability approach. However, in securities investments, the good creditworthiness of the issuer and the related value stability are key investment criteria, with green and / or ESG criteria being of secondary importance.
- Social responsibility / role with the community.
- ESG investments in general.
- Sustainability, pricing and lower PD.
- General interest in sustainable, social, and 'green' projects / investments as well as pricing and credit quality.
- Market shift towards SRI investment is pushed both by regulation and customer behaviour.
- Interest is actualised through the organisation's energy policy concerning assets, branches and headquarters with environmental aspects which are essential for investing in a responsible way.
- In cooperation with oekom, a sustainability filter has been implemented which considers criteria on environmental and other sustainability issues. Where possible, securities are added to the portfolio in accordance to the overall corporate strategy.
- One organisation noted that if market interest is expressed they will consider implementing such a product.
- Corporate responsibility and enhanced awareness of global transformation
- Subsidising regimes and technology improvements
- Rather than market research it seems more accurate to speak of strategic scenario analysis. Sometimes market research is not able to capture emerging trends, although they remain an extremely effective tool for fine tuning the magnitude and timing of investments.

10 organisations (33%) reported no such interest in 'green' investments.

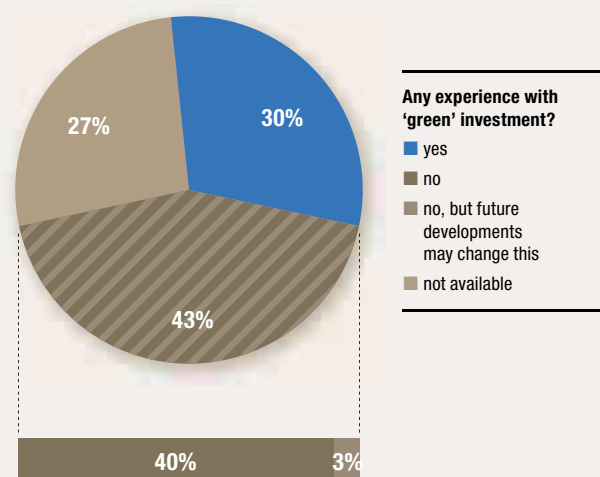


**5. G)** Does your organisation have experience with 'green' investment? If yes, what percentage of your investment portfolio is 'green'? Do you anticipate this increasing in the future?

Nine organisations (30%) answered "yes", providing the following details:

- Experience with SRI or ESG with the aim to continue this approach in the future.
- One organisation, which began with 'green' investments in 2016, anticipates to increase the share of 'green' investments in its portfolio.
- Three organisations with experience with 'green' investments noted that the percentage of these investments in the portfolio is low.
- One organisation referenced its website for future information on this point.
- One organisation noted having experience, but the definition of 'green' investment being very multifaceted with actually only 1% of the investment portfolio being considered as 'green' investments. The intention is to increase this level.
- One organisation reported that at group level, the sustainable investments in total recorded EUR 6.4 bn in 2015 with an upward trend in 2016 (figures not yet available).

13 organisations (43%) answered "no". One organisation noted that the data is not disclosed and a specific target is not given, but added that both political and market-driven recent developments make a case for a further increase in 'green' products.



**5. H)** Which 'green' criteria (please specify) are considered as part of your organisation's investment strategy? Please specify which information is requested when investing.

Nine organisations (30%) provided input to this question, noting the following:

- Focus is on energy efficiency and renewables;
- Impact reporting;
- Green criteria references to natural capital, to climate change, to adaptation;
- One organisation tracks mainly greenhouse gas emissions and abatement as well as the societal costs of their lending, either in terms of environmental flows or monetisation based on methodological and quantitative criteria;
- One organisation refers to its website for future information on this point;
- One organisation reports the lack of a written green strategy but a general interest in sustainable, social, and 'green' project/ investments as well as in pricing and credit quality;

- One organisation notes that no such criteria exist at present but is ready to implement a green investment strategy if decided at group level;
- Companies involved in severe offences against International Conventions on environmental issues are excluded from investments alongside oil producers and suppliers and mining companies;
- Several internal criteria in place to evaluate the environmental performance of companies such as the presence of a specific environmental policy, the percentage of renewable energy, plans for reducing emissions in the atmosphere, responsible use of water in the process, the development of eco-friendly products;
- Sustainable investments target companies meeting specific environmental, social and corporate governance (ESG) criteria. An example would be a firm that uses only sustainable energy. Since the term “sustainability” is rather broad, internal strict

criteria are set to determine whether a given investment is sustainable or not. A sustainable or ethical investment fund must have included the theme of sustainability in its investment strategy, which should be about excluding things like tobacco and firearms;

- Sustainability indicators are based on data from Sustainalytics, a research firm specialising in ESG and corporate governance research and analysis;
- Impact investing is an important component of sustainable investment advice and involves clients investing in companies aiming to make a measurable, positive contribution to society or the environment – businesses specialising in microfinance or stimulating local economies, for instance.

Five organisations noted not having such criteria, level of analysis or ‘green’ experience.



# INTERNATIONAL CASE STUDIES

This section aims to provide an international dimension to the energy efficient mortgage discussions by presenting three international comparative reviews of the financing of energy efficiency.

## UNITED STATES

By David Rosen, PhD, DRA

The US has engaged in very large scale residential building EE retrofit and finance efforts for more than three decades. Utilities, regulated by state governments in the US, face renewable energy portfolio standards (REPS), which establish quantified goals for the production of energy from renewable sources (e.g., solar, wind, geothermal). A growing number of state utility regulators are now adopting energy efficiency portfolio standards (EEPS) (New York, North Carolina), which require utilities to reduce energy consumption among their customers through EE retrofit programs. These efforts are supported by rebates and tariff reductions in support of EE and renewable energy home improvements. Mortgage lenders and mortgage insurers have specialised “green mortgage” programs, and the US tax code provides incentives for energy conservation and renewable projects. Federal cash subsidies (fiscal supports) for home EE retrofits, loan guaranties and related program total more than USD 10 billion over the last decade alone.

The Database of State Incentives for Renewables and Efficiency (DSIRE) website provides a comprehensive catalogue of state EE programs (rebate, grant, tax incentive, tariff reduction, finance, credit enhancement, secondary mortgage market) for home energy retrofit programs nationwide: <http://www.dsireusa.org/>.

In the United States, most states have substantially revised their building codes to require ever-greater EE. Led by California dating back to 1978 with its Title 24 building code standards, continuously strengthened by California through 2015, a variety of environmental certification systems have since emerged such as LEED, EnergyStar, Home Energy Rating System (HERS), GreenPoint rating and other systems. These building codes apply to new construction, and in some cases, to substantial renovation. They do not apply to stand-alone EE home retrofit projects.

### GREEN VALUE

The “green value” of a building is defined by the impact on property value of EE and other environmentally friendly features, access to public transportation and other measures. Research on this topic usually focuses on the energy dimension of green value. The first attempts to assess green value in the US, and Europe (Germany and Switzerland) (Taffin, Rosen, 2015), estimated gains of around 5% for “green buildings,” mostly commercial, characterised by regulator definitions or certifications.

A 2012 study in California assessed the effect of green labeling on the sale price of homes (Kok, Kahn). The study examined 1.6 million single-family home sales between 2007-2012 in California. However, of these homes only 4,321 were certified under the EnergyStar Version 2 format, GreenPoint rated, or LEED for Homes. The study controlled for a large number of variables that affect real estate pricing, and found a **positive correlation between green labeling and price of 9%** with an

error of +/- 4%. The authors calculate that with an average sale price of non-energy efficient/energy labelled homes in California of USD 400,000 during this period, a price premium for a certified green home equates to approximately USD 35,000 in value for a comparable nearby home. The authors note that the study’s findings echo results from prior research in the commercial real estate sector.

A study published in the US Appraisal Journal documents that **a home value increases USD 20 for every USD 1 decrease in annual energy costs**. An analysis by the Pacific Northwest National Laboratory found that building a home that exceeds the Model Energy Code might result in annual energy savings of USD 170-425. Applying these findings to the analysis published in the Appraisal Journal would equate to an increased home market value of USD 4,250-10,625.

A 2015 study performed by the Lawrence Berkeley National Laboratory examined the effect of solar PV systems on home sale prices. The study examined 22,822 sales, 3,951 of which contained PV systems, during the period 2002-2013. PV sale price premiums averaged USD 4/W, or \$15,000 for an average-sized 3.6-kW PV system. Statistically insignificant differences were found between new and existing home sales. This “PV Value” held consistently across states, housing and PV markets, and home types. The market appeared to depreciate PV systems in their first ten years, a rate which exceeds the rate of PV efficiency losses. The net cost of PV systems, taking into account government and utility subsidies, appeared to be the best proxy for market premiums. The authors note income-based estimates may perform equally well to estimate market premiums, if they can account for local utility tariff structures and subsidies. (Hoen, et al, 2015).

A small Colorado study was inconclusive in quantifying a value premium for EE of new and existing homes in a variety of Denver submarkets. On an individual case basis, the study did find positive values associated with measures of a home’s EE. However, the authors conclude that “(s) tandardised documentation about EE appears to be in its infancy.” (Desmarais, 2015, Colorado Energy Office).

In the United States, lenders and appraisers have been slow to recognise the value of EE homes. This is beginning to change. Both the US Appraisal Institute and the Appraisal Foundation have undertaken green value assessment programs for residential real estate. The Appraisal Foundation and the US Department of Energy have entered into a memorandum of understanding to help assure that the uniform standards of Professional Appraisal Practice (US PAP) are applicable for energy performance and green valuations, and that appraisers are trained in the application of these standards. The Appraisal Foundation issued an Evaluation of Green and High-Performance Property: Background and Core Competency in 2015, providing guidance on green valuations for residential, commercial, multifamily and institutional properties.

## ENERGY EFFICIENCY AND MORTGAGE RISK

There is a paucity of research linking the EE rating of a home with the probability of default on the underlying mortgage for that home. However, those studies that have been conducted show promising correlations between mortgage and portfolio performance with green rating of the home (collateral). The Institute for Market Transformation conducted the only study in the US with researchers at the University of North Carolina Chapel Hill (Sahadi, et al, 2013). The UNC study examined actual loan performance data obtained from CoreLogic by assessing whether residential EE was associated with lower default and prepayment risks. The authors, accounting for loan, household and neighbourhood characteristics, constructed a study sample of 71,000 EnergyStar and non-EnergyStar rated single-family mortgages. About 35% of the total sample, or 21,000 homes, were EnergyStar rated. Nationally in the United States, the market penetration of the EnergyStar label in new housing construction is noteworthy, with approximately 25% of new US housing starts certified as EnergyStar in 2011. To earn an EnergyStar rating, a home must generally achieve a Home Energy Rating Score (HERS) of 85 or better, indicating at least a 15% improvement over homes built to the current market standard (2006 International Energy Conservation Code Standard), normalised to climate zone, size and type of house.

Controlling for other loan performance variables, **the study found that owners of EnergyStar homes were, on average, 32% less likely to default on those homes rated EnergyStar, compared to comparable homes without such a rating.** The authors note, “This finding is robust, significant, and consistent.” Significantly, **the study found that a borrower in an EnergyStar residence is 25% less likely to prepay the mortgage than a borrower in a home without such a designation.** Furthermore, the study found that within EnergyStar rated homes, default risk continued to decline as the EE rating of the home improved. The authors conclude that the lower risk of default and prepayment associated with EE should be taken into consideration when underwriting home mortgages.

## ENERGY EFFICIENT MORTGAGES IN THE UNITED STATES

Fannie Mae, Freddie Mac, FHA and the Veterans Administration (VA) have all adopted special underwriting guidelines to take into account EE of homes for mortgage underwriting. EE mortgages generally attribute more income to mortgage paying ability associated with lower projected energy costs of home ownership for the borrower. Some of these loans allowed for the financing of energy improvements at purchase, while others attributed alternative underwriting to homes with higher EE ratings. There is poor data availability on the origination of EE mortgages designed by these guarantee agencies.

In August of 2015, then President Obama announced two home EE initiatives: (1) “stretched” underwriting by FHA for homes with better than average Home Energy Scores (Score); and (2) FHA approval of Property Assessed Clean Energy (PACE) financing on homes, in some cases.

FHA will expand its EE Homes (EEH) mortgage product to recognise the home’s Score. Homes with scores of 6 or higher (on a ten point scale) will qualify for a 2% “stretch ratio” on a new or refinance mortgage. FHA housing debt-to-income ratio (“front end ratio”) will be increased from 31% to 33%; the “back end” ratio, or total household debt to income, will increase from 43% to 45%.

FHA noted, in announcing the program, that a home’s Score will be calculated by a home energy “Assessor”, who inputs information about the home’s characteristics into energy modelling software developed by the US Department of Energy and the Lawrence Berkeley National Laboratory. The Home

Energy Scoring Tool software is designed to compare homes’ performance, regardless of where they are located, or the number of occupants. FHA notes that the Score model is used primarily for existing homes. In contrast, the Home Energy Rating System (HERS) score is primarily used for new homes.

FHA’s PACE program addresses a market acceptance challenge. PACE programs have been enacted in 30 states, and Washington, D.C. Under the PACE program, property owners receive financing for EE retrofits, which is repaid by property tax assessments on the homes. These assessments have a senior lien position the home’s mortgage loan. FHA will make mortgage financing available on homes with subordinated PACE loans, under certain circumstances. FHA has issued guidance on the conditions it will approve financing for homes with PACE loans.

## ENERGY EFFICIENCY RETROFIT LOAN PERFORMANCE IN THE UNITED STATES

The most recent and largest demonstration of home energy retrofit performance, with regards to both energy savings and EE retrofit loan repayment performance, is associated with the Better Buildings Neighborhood Program (BBNP) conducted with Stimulus Act funding by the US Department of Energy (DOE). DOE awarded USD 500 million dollars to 41 grantees throughout the US to conduct a wide range of EE retrofit programs for residential and commercial buildings. Of 99,000 implemented projects, 74,184 were residential EE retrofits, comprising 75% of total BBNP project retrofits. Total energy source savings within the residential EE retrofit programs were 3.0 MMBtus. BBNP program participants estimated energy savings of 22% with average actual savings of 15% for a 71% realisation rate. That is, 71% of projected energy savings were realised when building performance was measured post retrofit.

Of the 41 BBNP grantees, 36 used their DOE grant funds to support financing of EE retrofits. 18% of residential retrofit projects received loans. The US State and Local Energy Efficiency Network reports that 10-20% of residential EE retrofits nationally participated in financing, rendering the BBNP 18% financing rate within expected production. Several independent evaluations of the program found that financing was not important for most residential participants, but some participants reported that financing was very important for them. Of those that did take out loans, 73% gave high ratings to the role of the loan in their EE upgrade decision. Aggregate default rates on BBNP EE retrofit loans were less than 1%. Despite the very low default rate, EE retrofit loan production was low and did not reach levels necessary to attract broad interest among financial institutions. Multifamily rental EE retrofit loan programs have found similarly low default rates, with very high loan repayment performance.

As part of its research correlating EE performance and financial performance of residential real estate, DOE conducted a literature review of the impact of EE on the financial performance of commercial buildings. More than 50 studies were reviewed. (See Energy Efficiency and Financial Performance: A Review of Studies in the Market, March 2014, US DOE, Waypoint, for the complete bibliography.) The study originally sought to review all research on EE and financial performance, but the final product focused on “green labelled” buildings, using either a LEED [Leadership in Energy and Environmental Design] designation or Energy Star certification of DOE. The studies found positive correlations with EE designation and rental rates, occupancy rates, utility expenses, sales prices and construction costs. Preliminary correlations were found with tenant quality, occupant health, comfort and productivity, and capitalisation (cap) rates. Mixed results were found correlating to total operating costs.

# JAPAN

By Shoichiro Konishi, Japan Housing Finance Agency

The Act on the Rational Use of Energy was enacted in 1979 as Japan experienced the oil crisis in 1970s, in which EE standards of factories, transportation and buildings were stipulated. The measures were enhanced when the act was amended, e.g. in 1998 substantially as the Kyoto Protocol was adopted in COP3 in 1997.

Responding to the Act, EE standards for houses were stipulated in 1980. Thereafter, EE performance grades were stipulated so that consumers could compare the standards more easily, which are now called thermal insulation performance grades. The higher the standard, the greater is the grade number. The standards and grades were both stipulated by the government. The relation of the standards and grades is indicated in Figure No. (1), the classifications of which are used for EE mortgages provided by Japan Housing Finance Agency.

## EE Mortgages Provided By Japan Housing Finance Agency (JHF) (Former Government Housing Loan Corporation (GHLC))

The government has been providing incentives of tax reduction, subsidies and EE house points exchangeable for commodities and other incentives to promote EE of houses, including the subsidies to the EE mortgages provided by JHF.

GHLC was founded in 1950 and was fully owned by the government. GHLC had funded 19.41 million houses by the end of FY2006, which occupied 30% of the houses built after the World War II in Japan. GHLC mainly had provided long term fixed rate mortgages directly to the customers. The rights and obligations of GHLC were succeeded to by JHF in FY2007. JHF mainly provides long term fixed rate mortgages through their securitisation business. Both GHLC and JHF have established proprietary technical standards of housing construction besides the general building standards applicable to all houses. Furthermore, they have promoted the quality of the houses by **providing incentives of additional loan amounts and interest rate reduction to the higher quality houses that satisfy the EE** and other standards important to the government policy. JHF has also conducted house inspections to supply mortgages. Some 10% of all JHF staff are architects and engineers, who establish proprietary technical standards and house inspection schemes. This is a significant commitment of staff resources by JHF, whose principal mission serves as a housing finance institution.

## Flat35

Flat35 is the long term fixed rate mortgage (the interest rate is “flat” for 35 years) that is provided through the securitisation business, in which JHF purchases mortgages executed by private financial institutions and securitises them to MBS. There have been more than one million applications so far. One of the basic technical standards for Flat35 is “thermal insulation performance grade 2” equivalent. The grade 2 could save some 30% of heating and cooling energy in houses per annum compared to the grade 1 that conducts no EE measures, which doesn’t satisfy Flat35 technical standards.

## Flat35S (Special)

### ■ Flat35S:

The interest rate of Flat35S is reduced by a certain rate from that of Flat35 when the house satisfies one of the four high technical standards regarding EE, earthquake resilience, elderly accessibility, and durability and flexibility. This scheme was launched in 2005. The cost for the reduction has been subsidised by the government, as this measure is a policy mandate.

There are two interest rate types of Flat35S. JHF reduces 0.3% per annum for the first 5 years with Flat35S interest rate B type that satisfies “thermal insulation performance grade 4”. JHF reduces 0.3% per annum for the first 10 years with Flat35S interest rate A type that satisfies “first energy consumption grade 5”. The EE standards are shown in the Figure No. (1). Flat35S interest rate B type houses could save some 60% of heating and cooling energy in houses per annum compared to non Flat35 houses. Resident health also improves, as bronchial asthma and atopic dermatitis decrease in the EE house, owing to reduction of the temperature difference in houses and indoor air quality.

### ■ Expansion in Economic Stimulus Measures:

The interest rate reduction scale and term of Flat35S has been temporarily expanded several times by the government economic stimulus measures in the range of 0.3-1.0% and 5-10 years respectively. The government aimed at stimulating the economy and simultaneously promoting the enhancement of houses to address the policy issues.

### ■ Flat35S Eco (The Measure for Great East Japan Earthquake In 2011):

A great earthquake hit East Japan in 2011, with nearly 20,000 people dead or missing. A big tsunami hit the nuclear power plant in Fukushima and electric power fell short. To revive the economy and promote EE for houses, Flat35S Eco was launched. The interest rate reduction scale was expanded from 0.3 to 1.0% in the disaster area and to 0.7% in the other area for about one year. Flat35S is used for EE to cope with the natural disaster as described.

### ■ Measures for Existing Houses (including renovation):

It is critical to renovate the existing housing supply in Japan, with many vacant houses. In 2005, 61% of the total existing houses were without any EE measures. Therefore, special technical standards for existing houses to adopt Flat35S interest rate B type were stipulated, which simply require the use of double sashes or insulating glass in the doors and windows. Furthermore, a new program will be launched this October where the interest rate reduction scale will be expanded from 0.3% to 0.6% when the existing house after renovation satisfies Flat 35S regular technical standards. These are not temporary but permanent programs.

### ■ Rental Houses:

JHF provides direct loans with long term fixed interest rates for EE rental houses for households with small children and those with nursing services for the elderly. This is another priority for government policy. EE requirement is “thermal insulation performance grade 4”. JHF also promotes EE of rental houses whose qualities tend to be lower than the owner occupied houses.

### ■ House Inspection:

JHF conducts proprietary house inspections to provide Flat35, including a check if the house meets technical standards for Flat35S. There are three stages for house inspections for newly built detached houses: (1) drawings inspection; (2) on-site inspection on completion of roof construction; and (3) on-site inspection on completion. For condominiums, there are two inspections: (1) drawings inspection; and (2) on-site inspection on completion. JHF also conducts house inspections for existing houses and rental houses. JHF contracts out house inspection operations to the private inspection institutions and local government units, e.g. to some 125 private inspection institutions for Flat35, so that JHF may conduct house inspections all over Japan.

## EE Standards and Flat35, and Others:

EE standards, etc.	Thermal insulation performance grades, etc.	Energy consumption for heating and cooling in houses per annum*2	Share in the all existing houses*4	Flat35 product types	Flat35 interest rates *As of August 2016*6
Prior to the year 1980 standard	Grade 1	56 GJ	61%	Non Flat35	Grade 1
The year 1980 standard	Grade 2	39 GJ	21%	Flat35	Grade 2
The year 1992 standard	Grade 3	32 GJ	14%	Flat35	Grade 3
The year 1999 standard	Grade 4	22 GJ	4%	Flat35S interest rate B type (For the first 5 years Δ0.3% per annum)*5	For the first 5 years 0.60%, the remaining period 0.90%
Leading standard*1	First energy consumption grade 5*1	*3	—	Flat35S interest rate A type (For the first 10 years Δ0.3% per annum)*5	For the first 10 years 0.60%, the remaining period 0.90%

\*1: The leading standard that is stipulated in Act on the Improvement of Energy Consumption Performance of Buildings in 2015. The grades based on first energy consumption are stipulated, rather than the grades based on thermal insulation performance.

\*2: Source : Ministry of Land, Infrastructure, Transport and Tourism  
Scale : Gigajoule

\*3: First energy consumption of the houses that satisfy “first energy consumption grade 5” is reduced by some 10% compared to that of the houses that satisfy “thermal insulation performance grade 4” with general equipment.

\*4: Source : Ministry of the Environment, As of the year 2005

\*5: There are additional EE standards for the houses to adopt Flat 35S interest rate B type or A type other than the standards that are indicated in this figure regarding specificities for detached houses or other types of buildings. These standards represent a marginal set with respect to those represented in the table.

\*6: The lowest interest rates for Flat 35 of repayment term 21-35 years and maximum LTV 90%.

## EE MORTGAGES BY PRIVATE FINANCIAL INSTITUTIONS AND LOCAL GOVERNMENT

Some private financial institutions and local government units provide EE mortgages by reducing the interest rates or subsidising. Nevertheless, they are not popular products. The mortgage interest rates of private financial institutions are so low (0.625% for ARM, as of August 2016) that they could hardly reduce the interest rates or provide incentives. They don't seem to find the advantage of promoting EE houses with some costs to increase their mortgage portfolio. The local government units seem to focus more on the higher priority policies such as decreasing birth-rate and aging population than EE policy with their limited budgets.

## FUTURE POLICY DIRECTION FOR EE HOUSES

In 2020 when Tokyo Olympic and Paralympic Games will be held, the government will impose some EE standards to all the new houses for the first time in Japan. The government seeks to make the ZEH house (Net Zero Energy House, producing the same energy as consumed at the house) to be the standard house (more than the half of new houses) by 2020. JHF may be required to promote EE more by providing mortgages with interest rate reduction and other incentives responding these government policies.

# CANADA

By Kathryn Laflamme, Canada Mortgage Housing Corporation

## NATIONAL POLICY CONTEXT

In the summer of 2016, the Government of Canada launched a national campaign to solicit input for the future of housing in Canada. One of the core principles of this campaign is a focus on promoting environmentally sustainable and resilient homes that contribute to Canada's climate change goals. In 2015, the federal government committed to reducing greenhouse gas emissions (GHG) by 30% below 2005 levels by 2030. This signals the federal government's recognition that housing has a large impact on the environment and that there is growing interest for housing options that contribute to a cleaner environment and housing affordability. The residential sector is responsible for 15% of GHG emissions in Canada<sup>9</sup>.

Over 70% of Canada's housing stock was built in 1990 or earlier<sup>10</sup>. According to the 2015 Canadian Home Builders' Association Home Buyer Preference

Study, 64% of homebuyers rated an overall EE home as a 'must have' item, and an additional 25% considered it a 'really want' item. Given the government and housing industry emphasis on EE combined with an aging Canadian housing stock, as Canadians look to renovate their homes, many mortgage lenders may seek to capitalise on this demand. This will in turn influence the mortgage market offerings for financing home renovations.

## REGULATORY REQUIREMENTS

As construction in Canada is regulated by the provinces and territories, there is no coordinated, national approach to EE standards in housing that currently exists. National building codes are model codes and have no legal status unless they are adopted by a province, territory or municipal

<sup>9</sup> Natural Resources Canada. *Energy Efficiency Trends in Canada, 1990 to 2009*.

<sup>10</sup> Canada Mortgage and Housing Corporation. *Dwelling Condition by Tenure and Period of Construction, Canada, 2011*.

government. Because of this, Canadian jurisdictions have taken a variety of approaches to regulating greater energy and water-use efficiency in buildings, by either using their individual building codes, or applying legislation specifically addressing EE, or both. Noteworthy jurisdictions include the provinces of British Columbia and Ontario. British Columbia has a broad and comprehensive Climate Change program which includes energy code amendments. In May 2016, Ontario announced climate change legislation aimed at stimulating a shift to a low-carbon economy.

### TREND: RISE OF VOLUNTARY LABELLING STANDARDS FOR HOUSING

A particularly noteworthy trend in Canada is the rise in the development and deployment of a range of rating and labelling systems that characterise and communicate the environmental features and performance of housing and communities. These independent, third-party rating and labelling programs help consumers to make more informed choices about the environmental performance of the new homes they purchase, or the renovation of their existing homes. The programs range from single attribute (e.g. EE) type programs to multi-attribute programs that consider a wider range of performance indicators including indoor air quality, environmental impact, resource use and waste management.

The EnerGuide rating system (ERS) developed by Natural Resources Canada (NRCAN) is widely used to evaluate and label the EE performance levels of new and existing homes. In 2016, NRCAN released a new version of its EnerGuide Rating System (ERS) which evaluates a home based on the number of gigajoules it is expected to consume annually using standard operating conditions. This new scale is being gradually rolled out across the country replacing the existing system which scores EE of a house between 0 and 100; the more efficient the house, the higher the rating. As of July 2016, 1.037 million homes have been evaluated and received an ERS rating. Over 75% of those homes are located in Ontario (51%), Quebec (13%) and British Columbia (12%). The rating achieved by a home varies widely based on when the home was built and the degree to which it has received EE renovations. For example, homes built during the 1960s received on average a rating of 60, whereas those built in the 2010s received on average a 76.

The most prevalent labelling system in Canada is ENERGY STAR® (over 60,000 homes in Canada are labelled ENERGY STAR®). An ENERGY STAR® qualified new home is on average 20% more energy efficient than a home built to code. Various government and mortgage industry incentive programs are linked to the ENERGY STAR® standard.

### MORTGAGE INDUSTRY PRACTICE

In Canada, legislation requires federally-regulated and most provincially-regulated mortgage lenders to purchase mortgage loan insurance (MLI) when a borrower has less than a 20% down payment. MLI is provided either by Canada Mortgage and Housing Corporation (CMHC) or a private insurer. Lenders are required to pay a premium which varies based on a number of factors related to the loan application including, but not limited to, the proposed use of the property (e.g. owner-occupied or rental), loan-to-value ratio and type of loan (e.g. purchase or refinance). Current industry practice is that this premium payment is passed on to the borrower.

**At present, all mortgage insurers in Canada offer a program that offers partial MLI premium refunds to eligible borrowers if their home reaches a certain level of EE.** In June 2016, CMHC enhanced its Green Home Program to offer a MLI premium refund of either 15% or 25% to borrowers who either buy, build or renovate for EE using CMHC-insured financing. Prior to this enhancement CMHC offered a 10% refund. CMHC's new premium refund structure recognises different levels of EE and provides a greater percentage of premium refund for homes achieving a higher level of EE. Therefore, the more energy efficient the home, the greater the potential premium refund for the homeowner.

Within the Green Home Program, standard underwriting procedure is followed and the pricing of the MLI is the same. The premium refund is given to eligible homeowners after the full premium amount has been paid and

the mortgage loan has been advanced. In order to be eligible for a premium refund, a homeowner must prove that their home has achieved a certain level of EE. While CMHC requires a one-time assessment of the home's EE, the documentation provided by the homeowner must not be older than 5 years in order to ensure that the Program continues to encourage above standard levels of EE. For home purchases, this can be accomplished in one of two ways: the home can be built under a certain pre-qualified labelling standard (e.g. ENERGY STAR®, R-2000, etc.) or the home can be assessed using the NRCAN ERS and achieving a prescribed minimum rating. For home renovations, the required improvements in EE depend on the initial ERS rating of the property in order to recognise that the more energy efficient a home is to begin with the more difficult it is to achieve EE gains.

### MORTGAGE LENDERS PRACTICE

Around five years ago, some of Canada's big lenders offered green mortgages – e.g. rate discounts of posted interest rate or rebates off of the mortgage principal for ENERGY STAR® qualified purchases - but most of these products are no longer available. Today, some lending institutions offer cash backs to borrowers for the purchase of a home meeting a certain level of EE; however, these incentives are relatively limited both in number and in benefit to the borrower. For example, one credit union offers up to CAD 2,000 cash back for the purchase of a new home labelled as ENERGY STAR® or LEED® Canada. Standard underwriting applies including that the loan would have to meet legislative requirements (e.g. maximum 95% LTV).

### GOVERNMENT AND PRIVATE-SECTOR INCENTIVES

Various levels of government and utility providers offer green incentives to homeowners. These offerings fall primarily into three categories: rebates/financial incentives (e.g. cash back for EE renovations or cash back for the purchase of an ENERGY STAR® home); low-cost loans to make EE improvements to existing homes offered through either municipal governments or utility providers; and appliance replacement programs (rebates for the replacement of an older appliance with a new EE appliance). Similar to the mortgage insurer programs, the primary method of verifying energy performance for these programs is through either an NRCAN rating or being enrolled in a labelling program.

### NEXT STEPS, FUTURE POLICY DIRECTION AND MORTGAGE INDUSTRY TRENDS

There is a variety of fragmented EE incentives, programs and policies underway in Canada from many different players. Any of these incentive programs will likely not, on their own, cause a large shift in the green mortgage market. However, as various levels of government continue to shift attention to policies and programs directed at reducing harmful impacts on the environment, it could potentially influence more mortgage lenders to enter or re-enter the “green” mortgage field or offer other financial incentives geared towards EE in homes.

### KEY FINDINGS AND NEXT STEPS FOR THE EU

COP 21 provides strong international agreement on the importance of EE toward the goal of reducing greenhouse gas emissions and global climate change. The retrofit of existing housing is critically important to this goal. Building codes focused on EE standards for new construction alone will prove inadequate; all industry stakeholders and their government partners will need to develop verifiable, large-scale home EE programs.

Long-standing efforts dating back nearly 40 years throughout the EU, US and Japan have built up a rich industry and government track record of best practices, from which home EE retrofit policies may be developed. These efforts have largely been focused on northern countries and regions among developed economies. Despite this long-standing practice, residential EE programs are marked by many, diverse and somewhat disjointed efforts.

This is a fragmented market in practice without clear, common standards. Home EE retrofit policy and practice are more strongly correlated in Japan, with GHLC and JHF operating as lead policy making and implementing agencies nationwide.

Perhaps as a result of these fragmented markets and public private practices, the home energy retrofit efforts of capital markets, issuers and lenders are immature, marked by scepticism in the financial world—including lenders, issuers, investors and regulators—about the predictive value of EE labels and associated loans. However, **extensive and consistent research on Green Value demonstrates a strong correlation for positive effects on collateral (house value) associated with better EE performance and higher EE ratings.** While research on EE mortgage portfolio performance is young, initial findings are promising. This is especially true of the UNC Chapel Hill study in the United States, which found material improvement in performance in default, loss and prepayment speed for homebuyers purchasing EE homes, compared to comparable homes that are less efficient. This research on mortgage portfolio performance needs to grow so that an empirical track record can be amassed for underwriting, credit, valuation and regulatory purposes. The EeMAP initiative importantly anticipates the growing significance of a “brown discount” on collateral with low EE performance ratings. This points to risk in portfolios that lenders, issuers, investors and regulators, not to mention homeowners, are wise to anticipate and avoid with a clear energy efficient mortgage program, as the EeMAP proposes.

Moreover, Japan has found a promising indication of health benefits for residents of EE homes, offering another policy imperative for advancing residential EE.

The EeMAP initiative focus on measuring consumption, through data sharing and partnerships with major utilities, represents a critical advance. This will provide verifiable, quantified measures by which to reward EE performance with improved loan pricing, underwriting, credit policy and regulatory treatment—and market valuation. These data will prove critical in quantifying the effects of EE on mortgage portfolio performance, both at the originator (mortgage lender) and investor (mortgage security, covered bond and other instruments) level.

Longstanding international practice across three continents also underscores the importance of integrating fiscal policy support with mortgage finance practice and regulation. This should also be coordinated with utility regulation and EE utility portfolio performance standards. Linking the entire supply chain of energy generation, energy regulation, mortgage policy and regulation, home energy performance measures, and the home retrofit industry will prove critical to achieving the scale necessary if we are to succeed in the goals articulated in the COP 21 Agreement.





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