

EMF-ECBC Energy Efficient Mortgages Action Plan

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 efficient 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.

The **ultimate objective** of this pan-European initiative is to design a private bank financing mechanism, based on a standardised approach and a market benchmark, 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. Moreover, validation of end user/homeowner needs and requirements will be captured during this project through customer research. This insight work will be important in ensuring that the output of the project can be implemented across EU mortgage markets, and in ensuring that a customer pull for the product can be cultivated by lending institutions. The initiative is entirely independent from, but complementary to, public funds or tax incentives and utility rebates.

- Buildings are responsible for 40% of energy consumption & 36% of CO₂ emissions in the EU.
- By improving the energy efficiency (EE) of buildings, total EU energy consumption could be reduced by 5%-6% and CO₂ emissions by 5%.
- 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.
- In the context of the EU's subsequent 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, which is independent from, but complimentary too, public funds, tax incentives and utility rebates.
- The EMF-ECBC initiative is based on a clear incentive chain, which 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.
- Based on a set of energy efficiency indicators, lenders would 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.
- Measurement of the energy efficiency improvement would 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.
- The proposed framework would allow for the creation of a standardised approach to energy efficiency investment in property.
- The initiative will investigate potential requirements for the quality of EPC data, to help provide lenders with assurance of their accuracy and in turn increase the penetration of EPCs and drive their quality.

- This initiative would address 3 areas of potential risk: credit risk, asset risk and performance risk
- To this end, the EMF-ECBC will establish a clear governance structure to establish and manage a definition of an “energy efficient mortgage”, a “data warehouse” and an “energy passport”.
- 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.

I. BACKGROUND

The EU has set itself an overall 20% **energy 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 a €100 billion a year until 2050 in the EU building stock in order to deliver Europe’s commitments on climate change. The EU has increased the amount of public funds available for energy efficiency (EE), but the European Commission suggests there is a need to boost private EE investments through a targeted use of public funds, the development of robust investment solutions and support activities for project developers. The International Energy Agency has also called investments in EE and particularly in buildings a priority for all countries.

The EU’s EE target for 2020 was galvanised by the Paris Agreement adopted during COP21 in December 2015. The agreement 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. **COP22**, which will take place in Marrakech in November 2016, will cement the actions required to implement the Paris Agreement and, significantly, “green finance” will be one of the key themes of the event, underlining the relevance and timeliness of this Project. In particular, the decision by World leaders to limit global warming to well below 2°C creates an additional challenge that makes massive thermal renovation of the EU building stock a necessity.

In the EU, buildings are responsible for 40% of the total energy consumption and 36% of CO2 emissions. About 35% of EU's buildings are over 50 years old¹ and 75-90% of the building stock is predicted to remain standing in 2050² making energy efficient refurbishment a top priority for Europe. By improving the energy efficiency of buildings alone, the EU’s total energy consumption could be reduced by 5-6% and CO2 emissions by 5%³. Improving the energy efficiency (EE) of the current housing stock will prove a crucial role in redirecting energy consumption and greenhouse gas emissions, and is increasingly recognised as key to the health and wellbeing of European citizens.

With the EU’s EE of buildings target and the necessary funds required to meet it in mind, the importance of which has been underlined by the COP21 Agreement, there is a clear role for a **private, bank financing initiative** to support households in making energy efficiency improvements to their homes (hereafter referred to as the Project). The encouragement of energy performance is deliberately aligned with the EU’s Nearly Zero Energy Buildings under the Energy Performance Buildings Directive (NZEB) via the stimulation of EE and high energy performed buildings.

Considering that the European building stock constitutes the largest single energy consumer in the EU, and that the value of the European mortgage market is equal to 53 % of EU’s GDP⁴, there is huge potential to build a bridge between the finance and energy efficiency worlds and unlock the benefits of mortgage

¹ Source: EMF-ECBC

² *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 at: <https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report%20EEFIG%20v%209.1%2024022015%20clean%20FINAL%20sent.pdf>.

³ European Commission. Available here: <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

⁴ <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

financing to support energy efficiency to the benefit of all. Until now, there has been a lack of coordination between these two crucial elements of the broader energy debate and a bridging of this gap is a unique and important element of this initiative.

II. PROJECT CONCEPT

Core assumptions and incentive chain

Mortgage lenders in the EU are uniquely placed to play a game changing role in providing finance for energy efficient improvements to the EU's existing housing stock. They interact with households at a critical moment in the property lifecycle: when citizens purchase a property (or indeed remortgage)⁵ and therefore have a unique opportunity to influence consumer behaviour in a positive way, by bringing sustainability into the process. As indicated earlier, the EU's building stock constitutes the largest single energy consumer in the EU, and considering that the value of the European mortgage market is equal to 53 % of EU's GDP, there is huge potential to unlock mortgage financing to support increased energy efficiency investment for the benefit of all.

According to the underlying concept, mortgage lenders in the EU will offer households the possibility of a preferential interest rate and/or additional funds at the time of origination of the mortgage/re-mortgaging) in return for measurable energy efficient improvement in their property (both measurement mechanisms are described in more detail under Section III Project Methodology below). In an environment with low interest rates (or negative interest rates as the current one) it may seem not relevant the possibility of a preferential interest rates. However, the energy efficiency benefit can impact on the spread on the risk free rate, and thus the benefit is relevant even in an environment with low (or very low) interest rates. In the preferential interest rate, it should be included also the potential lower credit rationing performed by the banks given the lower probability to default (PD).

A standardised approach to the provision of mortgage financing for energy efficient investment will also ensure the ultimate pricing in of the added green value, triggered by energy retrofitting, which will help ensure that banks are able to recognise "energy efficient" assets in their risk profiling, and begin to help the market to recognise and price-in the value of energy efficient real estate.

The proposed mechanism ultimately rests on two key assumptions:

1. Firstly, that improving the energy efficiency of the property has a positive impact on property value – a series studies in the EU and individual Member States suggest that this correlation can be drawn (See Figure 1 below); and
2. Secondly, that energy efficient borrowers have a lower probability of default. This is because the consumer has more disposable income as a result of savings on the energy bill⁶.

In relation to assumption 1, during the course of the Project, much attention will be devoted to identifying the conditions and building the framework required for valuers to take account of EE features in valuations. As will be described later, to date, valuers have struggled to accurately determine the incremental value impact. The Project has the potential to be a significant trigger point and overcome this deficiency by allowing for the "green value" proposition to be clearly identified, measured and reflected in the valuation practice. Moreover, the project will provide the starting point for a continuous monitoring framework to track how green value and brown discounts develops across the EU and according to different building types. The latter is important since 'green value' and brown discount' are 'shifting targets' in the sense that they cannot

⁵ Research has shown that this stage in the lifecycle is a critical trigger point for EE improvements: <http://architecture2030.org/achieving-80x50-transforming-new-york-citys-building-stock/>

⁶ Energy cost data is currently not widely considered in mortgage affordability calculations, due in part to the limited understanding of the importance of energy performance and its impact on a borrower's disposable income.

be established once and for all as a specific amount or percentage. These will always vary according market developments, market segments, location, preferences, etc.

The testing and substantiation of the correlation between EE and probability of default (assumption 2) will be a further key element of the Project, as will be described in more detail in the subsequent section of this application.

FIGURE 1: RESULTS OF EARLIER STUDIES⁷.

Study	Country	Sample	Label type	Type:	Major findings
Brounen and Kok (2011)	Netherlands	2008-2009	A-G	Sales	Significant positive effects on sales prices. Relative to a D-label: A (10.2 %), B (5.5 %), C (2.1 %), E (-0.5%), F (-2.3 %) and G (-4.8 %).
Hyland et al. (2013)	Ireland	2008-2012	A-G	Listing price	Significant positive effects on sales & rental prices. Sales prices relative to a D-label: A(9.3 %), B (5.2 %), C (1.7 %), E (0 %), F/G(-10 %)
Sbi (2013)	Denmark	2011-2012	A-G	Sales	Significant positive effects on sales prices. Relative to a D-label: A/B (6.4 %), C (6 %), E (-6.2 %), F (-12.3 %) and G (-19.4 %).
Fuerst et al. (2015)	UK	1995-2012	A-G	Sales	Study show a measurable and significant positive effects on house prices. Dwellings with EPC sell: A/B (5 % premium), C (1.8 %), C (1.7 %), E (-0.7 %), F(-0.9 %) and G(-6.8 %).
Copenhagen Economics (2015)	Denmark	2006-2014	A-G	Sales	Clear and significant influence on house prices: A (10.2%), B (6.6%),C (3.5%),D (0.0%), E (-3.6%),F (-7.6%), G (-12.1%)
CRIF (2016)	Italy	2012-2015	A-G	Valuation	Direct correlation between property value and energy efficiency - study demonstrates under-valuation of more energy efficient properties and over-valuation of less energy efficient properties: A (-12.53%),B (-8,02%), C (-4.53%), D (-2,98) E (-0,65%), F (0.04%), G(3.79%)
Kok and Kahn (2012)	USA, Cali.	2007-2012	Green Label	Sales	California homes labelled with an Energy Star, LEED or GreenPoint rating sell for 9% more than comparable houses.

The two assumptions outlined above drive the incentive chain, which provides the ultimate, long-term business case for the initiative. The idea is that the initiative provides a micro-economic advantage for all of the actors in the chain, for example:

Borrowers:

⁷ Sources: Brounen, D. and Nils Kok (2011): "On the economics of energy labels in the housing market", Journal of Environmental Economics and Management 62, p. 166-179;
 Hyland, M., R.C. Lyons., S. Lyons (2013): "The value of domestic building energy efficiency — evidence from Ireland", Energy Economics 40, p. 943-952;
 SBI (2013): "Sammenhæng mellem energimærkning og salgspris" Statens Byggeforskningsinstitut in corporation with University of Aalborg, 2013(06);
 Fuerst, F., P. McAllister, A. Nanda, P. Wyatt (2015): "Does energy efficiency matter to home-buyers? An investigation of EPC ratings and transaction prices in England", Energy Economics 48, p. 145-156;
 Copenhagen Economics (2015). (Available at: [here](#)).
 CRIF (2016). (Available at: [here](#));
 Kok, N. and Kahn, M. E. (2012): "The Value of Green Labels in the California Housing Market", UCLA Institute of the Environment and Sustainability. (Available at: [here](#)).

- Borrowers are incentivised to improve the EE of their homes in return for a **preferential interest rate** after a certain period of time and/or **additional funds** at the time of the origination of the mortgage on the same terms as the mortgage on the property (as opposed to at the higher rate of a consumer loan).
- By making EE improvements, borrowers will increase the value of their property and protect their homes against a **“brown discount,”** ensuring wealth conservation. As indicated earlier, a series of studies suggest that this “green value” in residential buildings is identifiable and quantifiable in terms of price. See figure 1.
- Borrowers also benefit from the lower running costs for the building, reducing the overall costs of owning a property, which should compensate the upfront investment and would improve the mortgage payment.

Lenders:

- Research⁸ in the US shows that borrowers financing EE properties have a 32% **lower probability of default** on their loan. This is because the energy costs, which represent a large share of the monthly payments by the borrowers, are lower. This reduces not only the overall costs for the borrower but also the volatility of the monthly payments as the share of the energy costs sinks. The lower risk of the household is also recognised in Canada, where households receive a 10% Canada Mortgage & Housing Corporation (CMHC) mortgage loan insurance refund/rebate⁹ on mortgage loan insurance premiums if CMHC-insured financing is used to purchase an energy-efficient home or make energy-saving renovations. If the same correlation between energy efficient investment and default risk can be evidenced in the EU, banks will be able to demonstrate that EE mortgages are less risky due to a net cash flow saving. Banks can therefore consider **lower capital requirements** for those loans on their balance sheet if they use internal models or ask that regulators recognise lower risk-weights for these loans, given the lower probability of default, in the Basel Committee on Banking Supervision’s (BCBS) standardised approach.
- An increase in the value of the property as a result of EE retrofitting can **mitigate risk for lenders and reduce loss given default (LGD)**¹⁰. Alongside the probability of default, LGD is another key parameter for the calculation of banks’ capital requirements. Linked to the point above, therefore, a lower LGD for EE mortgages would provide further justification for lower capital requirements for this type of loans. By financing EE retro-fitting of mortgaged properties, lenders will also protect their portfolios against the **“brown discount”** mentioned above.
- Research in the UK shows that mortgage lenders could include more accurate estimates of energy costs in their lending assessments, which could reduce the risk of over- or under-lending by many thousands of pounds over the life of the mortgage – with a **doubling of accuracy** just by adding EPC data and data on dwelling type, age and size to standard information collected by UK lenders.¹¹

Investors:

- Particularly in the current low yield environment, but also – we expect – in “normal” market conditions, investors are increasingly looking for investments which have a **“sustainable”** aspect. There is **strong investor demand** for “green” covered bonds. Indeed, the market is already seeing increased investor demand for green debt assets as seen in senior unsecured and SSA issuance.

⁸ Institute for Market Transformation (IMT). (2013). Home Energy Efficiency and Mortgage Risks.

Available here: http://www.imt.org/uploads/resources/files/IMT_UNC_HomeEEMortgageRisksfinal.pdf.

⁹ http://www.cmhc-schl.gc.ca/en/co/moloin/moloin_008.cfm.

¹⁰ Loss Given Default (LGD) is a common parameter in risk models and determined by the Capital Requirement Regulation (CRR). LGD is the credit loss incurred by a bank if an obligor defaults, presented as a percentage of the total exposure to loan which the obligor defaulted on. At loan level, the LGD calculation is easily understood with the help of an example: If the client defaults with an outstanding debt of €200,000 and the bank or insurance is able to sell the security (e.g. an apartment) for a net price of €160,000 (including costs related to the repurchase), then the LGD is 20% (=€40,000 / €200,000).

¹¹ <http://www.ukqbc.org/sites/default/files/The%20role%20of%20energy%20bill%20modelling%20in%20mortgage%20affordability%20calculations.pdf>.

Moreover, several important investors have earmarked funds for investment into green assets and the carbon footprint.

- The initiative would also create an incentive to **make existing green assets visible**, i.e. segregate EE assets which are currently included in the cover pool without earmarking. EE business where it currently exists is not systematically separated from other banking operations, but doing so could help to create critical mass and speed up the transition.
- The **“green added value”** vs. the **“brown discount”** is also relevant here for investors from a **risk management** point of view, both in terms of credit, asset and performance risk.

Moreover, price differentiation typically occurs in economic downturns. This initiative would therefore also protect borrowers/lenders/investors against brown discount once the market distortions of the quantitative easing come to an end or the economic climate worsens. This impact is also recognised by the BCBS, which has begun investigating environmental issues from a financial stability perspective with climate developments impacting on the insurance industry, which, in turn, impacts the value and prices of property and thereby assets within banks’ balance sheets. This is also underlined by the World Economic Forum’s Global Risks Report 2016 (available [here](#)), which find that the greatest risk on the rise is environmental risk, and the potential failure of climate change mitigation and adaptation.

SMEs:

- The Project will likewise benefit the SME sector. The additional funds provided by lenders to finance the retrofitting of the property will deliver providing a flow of capital into the real economy supporting SMEs activity in the retrofitting sector.

Valuation Perspective

In addition to impact on the property value, energy efficiency of buildings impacts on the valuation of a property and the credit risk assessments involved. Arguably, most property rating systems are typically risk-indifferent in the sense they use average values if energy performance information of the asset is missing or is insufficiently documented. Energy efficiency is a strong potential value driver and risk factor, therefore the integration of energy efficiency in valuations and credit risk assessment could transform current lending practices. The RICS Red Book¹² already requires valuers to collect sustainability related information, which could potentially impact on value, regardless whether there is or is not direct market evidence. By doing so valuers will be contributing to the systematic improvement in data that will help ensure that, as markets become sensitised to sustainability issues, appropriate analysis can be undertaken to support future estimates of value. Importantly, valuers are required to flag up the absence or the failure to provide this information as a potential risk factor.

The Project will moreover build on the Renovalue¹³ and ReValue¹⁴ EU funded projects (see below for more details on both), and will as such provide a practical application of the valuation framework and guidance developed in this project.

Furthermore, the development of a data warehouse and the establishment of a framework for an energy passport will improve general market transparency by linking building performance and market transaction data, which is currently being considered the greatest obstacle to establish the existence of sales or rental price premiums.

Consumer Behaviour

¹² The 'Red Book' published by RICS contains mandatory rules, best practice guidance and related commentary for all members undertaking asset valuations

¹³ Renovalue focuses on developing training toolkit for property valuation professionals on how to factor energy efficiency and renewable energy issues into valuation practices. For more information please see here: <http://renovalue.eu/>

¹⁴ ReValue aims to develop standards that recognise Energy Efficiency Value in social and private residential real estate. For more information, please see here: <http://revalue-project.eu/>

The underlying structure of the methodology can also influence consumer behaviour and practices by encouraging good consumer energy behaviour, thus reducing the energy consumption (energy bills) in households. A growing body of evidence in academic literature demonstrates that there is potential for energy savings via targeted behaviour. By using feedback measures, which provide the consumer with information about the energy consumption, and structural factors, which can facilitate energy savings for the consumer, there is scope for motivating and measuring targeted behavioural change of potential energy saving up to 20%.¹⁵

Better Risk Management

Significantly, the Project would help address the following areas of potential risk:

- **Credit Risk:** is potentially reduced for the lender as a result of the lower probability of default and lower LGD associated with energy efficient mortgages;
- **Asset Risk:** as a result of the EE improvements, the property is protected against the “brown discount” and will actually increase in value.
- **Performance Risk:** a robust assessment of the energy performance of the property both before and after the retro-fitting of the property ensures that the EE measures taken actually result in an improvement to the energy efficiency of the property, to the households’ energy spending, and to the value of the property.

In doing so, the Project will help to promote a framework which, via the creation of a benchmarking of energy efficient mortgage and a standardisation of it, would provide additional risks assessment tools in the form of energy performance indicators and a labelling framework.

Broader Perspective

The underpinning structure of the Project also interrelate with a broader set of political priorities:

- **Jobs & Growth:** The Project is expected to boost private investment in EE improvements, largely through retrofitting, which will in turn boost SME activity in the retrofitting sector as highlighted above. This will contribute to the European Commission’s growth and job agenda under the Juncker Plan.
- **Financial Stability:**
Banks have 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. This pan-European market Project will trigger market due diligence for consumers, issuers and investors, reduce probability of borrowers’ default, facilitate de-risking of banks’ balance sheets and management of non-performing loans as well as enhance transparency and pricing in the market by adding a green factor to real estate.
- **Energy Efficiency:**
In addition, the Project also fits well within the European Commission own framework for climate and energy policies, which aims to encourage investments and boost private finance for energy efficiency investments/buildings. Particularly it is worth highlighting that to reach the 20% energy saving target by 2020, the [Energy Efficiency Directive](#)’s Article 4 contains a requirement for Member States to establish and periodically update ‘a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings’. The EE objective is furthermore supported by Article 7, which requires Member States to establish an “energy efficiency obligation” scheme, which obliges EU

¹⁵ O. Ozcevik; C.A. Brebbia; S.M. Sener. (2015). *Sustainable Development and Planning VII*. Ashurst: WIT Press, Page 786.

energy companies to achieve yearly energy savings of 1.5% of annual sales to final consumers¹⁶. In order to reach this target, companies have to carry out measures which help final consumers improve energy efficiency. This may include improving the heating system in consumers' homes, installing double glazed windows, or better insulating roofs to reduce energy consumption. In a broader perspective, the Project also fits Art. 9-12 on increasing consumer awareness of energy consumption and improving the transparency and understanding of energy related data.

This year, the European Commission is revising both the Energy Performance of Building Directive and the Energy Efficiency Directive, and other related initiatives are in the political pipeline. Creating an ambitious legal framework is an important prerequisite, but the implementation of these targets set by legislators requires mobilising both public and private stakeholder financing to bring about a systematic change, which can make the energy efficiency market more investible.

III. PROJECT METHODOLOGY

The following sections aim to present and describe the methodology of this Project.

Section A outlines the proposed mortgage financing mechanism. It describes the preferential financing conditions which would characterise the product and explains, via an example, how the "green value" could be incorporated into the mortgage affordability calculation, without increasing the credit risk, thus allowing addition funds to be provided to the consumer at the same rate as the principal mortgage.

Section B outlines the robust set of indicators that will be required in order to support the financing mechanism, by delivering accurate and reliable assessments of the energy efficient improvements of mortgage properties. Section B also provides an overview of the current challenges surrounding existing energy measurement indicators, in particular the EPC, and touches upon market recommendations for improvements which this Project will evaluate. Section B furthermore describes how a "Building Energy Passport", to provide a property retrofitting track record, could be created.

Section C focuses on how energy efficiency aspects can be included in property valuations through a closer engagement between the valuation profession, the financial and energy sectors, and how, as a result, valuers can better reflect sustainability related issues in addition to the traditional value drivers. This section highlights the challenges to date in the valuation of energy efficiency and sustainability building features. The Project will seek to address these barriers through standardised data collection routines and capacity building and training materials for valuation professionals.

Section D introduces a "data warehouse" which will provide an extensive data set to drive the Project through the development phase and then underpin the final mechanism in the longer-term.

Lastly, to provide an overview of how this project aims to create synergies and add to current energy performance projects (both private and EU funded) a list of national/international projects linked to the aims of the EeMAP are listed.

A. Financing Conditions

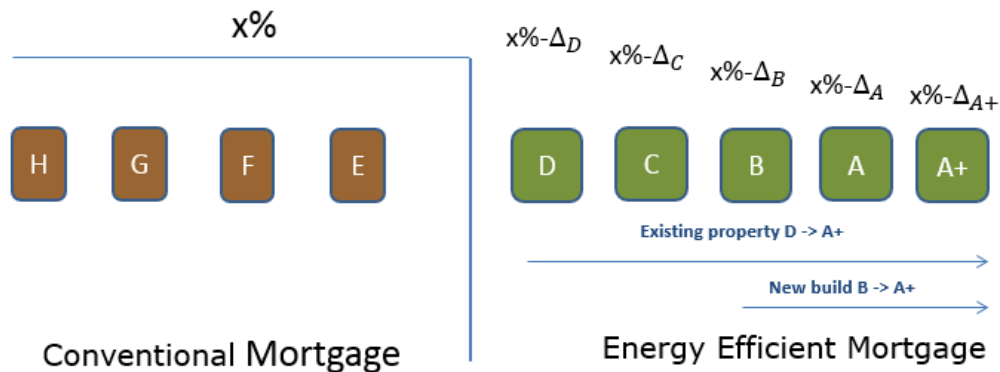
▪ Preferential interest rate

Based on a set of energy efficiency indicators (see page 13), lenders offer:

¹⁶ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013SC0451&from=EN>

- **New Build/Nearly Zero Energy Buildings (NZEB):** A discount in the interest rate for a new build property with a high energy rating that is compliant with the national NZEB standard and the European Commission’s guidance on NZEBs¹⁷;
- **Existing property to be renovated:** A discount in the interest rate after a certain period of time according to the improvement in the energy efficiency of the mortgaged residential property. In this way, borrowers are incentivised to move their property out of the “brown zone” depicted below – energy rating H-E, and into the “energy efficient zone” – energy rating D-A.

FIGURE 2: RELATIONSHIP BETWEEN A PROPERTY’S ENERGY RATING AND A POTENTIAL PREFERENTIAL MORTGAGE INTEREST RATE.



The discount on the interest rate would be determined on the basis of a progressive scale, aiming to incentivise more significant improvements in properties at the lower end of the energy rating D-A. The consumer would receive a larger percentage of the discount (Energy Rating A = 100% of discount), the further they move their property up in terms of energy rating. The discount itself would be calculated as a function of the reduced probability of default and eventually of the reduced bank’s capital requirements for this mortgage. If a borrower qualifies for or via retrofitting receives an energy efficient mortgage via the proposed market benchmark for energy efficiency investment in properties, that mortgage would receive a labelling and thereby be clearly segregated.

▪ **Additional Funds via the Recognition of “Green Value”**

For an existing property to be renovated, at the time of origination, the lender factors in both additional funds and the increased value of the property due to the retrofitting, meaning that the risk for the bank remains the same, for example

$$LTV_0 = \frac{80}{100} = 80\%$$

Without EE improvement

$$LTV_0 = \frac{80 + 8}{110} = 80\%$$

With cash advance factoring in EE improvements

The possibility to take account of an increase in the value is suggested in the recently published Second BCBS Consultation on Revisions to the Standardised Approach for Credit Risk¹⁸, which, at point 52 on page 35, states that “modifications made to the property that unequivocally increase its value could also be considered in the LTV”.

This mechanism: (1) allows the increase in value due to retrofitting to be factored in at origination, (2) enables the borrower to carry out retrofitting works on the purchase of the property and (3) provides a flow of capital into the real economy supporting SMEs activity as described earlier.

¹⁷ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016H1318&from=EN>

¹⁸ <http://www.bis.org/bcb/publ/d347.pdf>

B. Energy Efficiency Indicators: Three pillar Approach to Measurement of Energy Efficiency Improvements

Underpinning the Project is necessarily a robust set of energy efficiency indicators to measure accurately the energy efficiency improvement of the property.

The Energy Performance Certificate (EPC), introduced by the EU by way of the Energy Performance of Buildings Directive (EPBD), provides information, as the name suggests, on the energy efficiency of buildings (consumption and demand) and recommended improvements. Given that this is an EU standard, the EPC should be at the heart of the Project. However, as a result of concerns about data availability and reliability and qualification, control and monitoring of energy inspectors, the EPC alone is not a robust enough tool on which to base the initiative, not least because in its current form it is vulnerable to fraud.

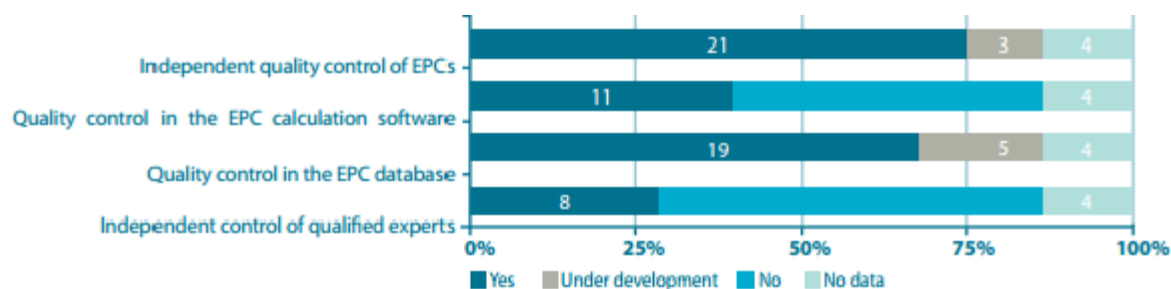
The implementation of EPCs across the region, their quality, potential areas for improvement, and sources of data on EPCs have been the subject of numerous existing studies.¹⁹

Certification is one of the major ongoing work-streams within the Concerted Action programme for the EPBD,²⁰ which provides country reports that detail how the EPC provisions work country by country. It notes that one of the challenges for the validity of EPC data is how to obtain realistic values rather than simply using possibly unrealistic default values without increasing the cost of data collection, bearing in mind that building documentation is not available for the majority of the building stock in need of renovation.

Therefore, in existing buildings the focus should be on further developing default values to allow for the comparison of buildings and on coming closer to realistic energy savings calculations at the same time. A good example is the publication of detailed building typologies at the regional level, thus providing default values that are closer to reality (e.g., Germany and Luxemburg). There are also other suggestions for possible solutions, such as ensuring that recommendations accompanying the EPC relate to actual climate and energy consumption (e.g., as Norway and The UK require).

There are many existing challenges with the EPC as a tool for accurately assessing performance values. For example, BPIE research has shown that quality control of EPCs is variable across the region:

FIGURE 3: INDEPENDENT QUALITY CONTROL OF EPCS ACROSS EU-28.

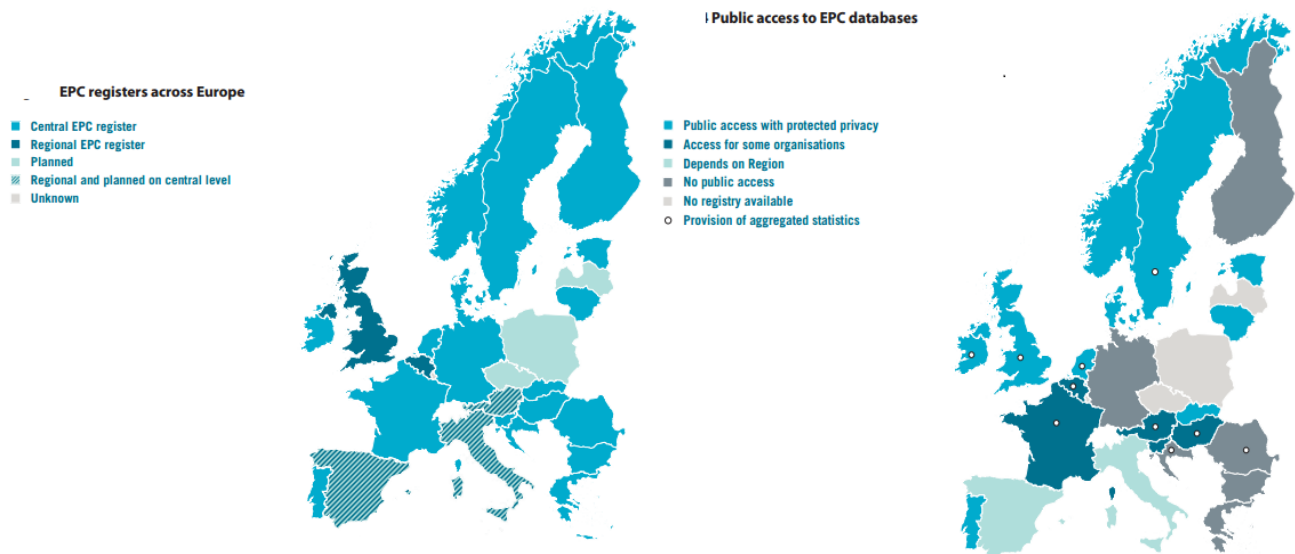


The availability and accessibility of registers that contain EPC data is not consistent across all EU28 countries as yet, as evidenced in Figure 5 in 2014.

FIGURE 4: EPC REGISTERS AND PUBLIC ACCESS TO EPC DATABASES ACROSS EUROPE.

¹⁹ [EPCs across the EU](#), BPIE, 2014 -

²⁰ <http://www.epbd-ca.eu/>



In terms of improving the instrument from an investor perspective, groups such as the Institutional Investor Group on Climate Change have recommended the introduction of EPCs that cover both the design performance and the operational performance of buildings, and that these be more regularly updated during the building's lifecycle.

It has been proposed that if the EPCs were an electronic tool, they could be updated on an annual or monthly basis with operational energy consumption data. They could also be connected to smart meters, so they evolve from a static to a dynamic tool that allows for continuous improvement of energy efficiency levels.

The IIGCC note that "At present EPC providers collect a wide range of data about each certified building but do not share this information with their clients, supplying only a PDF certificate with the rating. An obligation on EPC providers to supply all electronic information underlying the performance certificates to asset owners would convert EPCs from a static to a dynamic tool. This could in turn be used by asset owners to model and project the impact of building improvements on the EPC rating. Differences among countries stifle comparison and add a learning curve. As many differences from country to country should be abolished. IIGCC members foresee that Electronic EPC certificates could then be used for an operational performance 'rate and display' approach. They would become the foundation of an electronic building passport with more EU commonalities."

As well as reviewing existing literature on the use of the EPC as an energy performance indicator and ways it can be improved from a risk and investment perspective, the project will examine recommendations from various groups on evolving the instrument into a 'Building Energy Passport'.

Several projects dedicated to developing meaningful individual renovation plans for residential properties exist today, notably in France (Passeport Efficacité Énergétique "P2E" by The Shift Project, Carte Vitale by the Plan Bâtiment Durable), Germany (Sanierungsfahrplan in Baden-Württemberg, and developments at federal level), or in the UK (Whole House Plan concept). Several EU funded projects have looked at incremental retrofits too (EuroPhit, PassReg, Step-2-Sport).

The main anticipated features of a '**Building Energy Passport**' could include:

- A building renovation passport would start from, complement and prolongate the EPCs. Yet unlike the EPC, which is currently merely an administrative and rather static tool proposing a picture of what the building consumes, the passport proposes a tailor-made, ready to implement action plan to the building owner, based on an affordable audit.
- Like a health record for individuals or road test for vehicles, the passport is meant to be a holistic tool covering all aspects of buildings, including not only energy performance but also other regulated

aspects. The plan should integrate the owner’s individual project (extension, transformation, etc.) – this is key to secure buy-in and support for implementing the works. The passport would accompany the building over its life time.

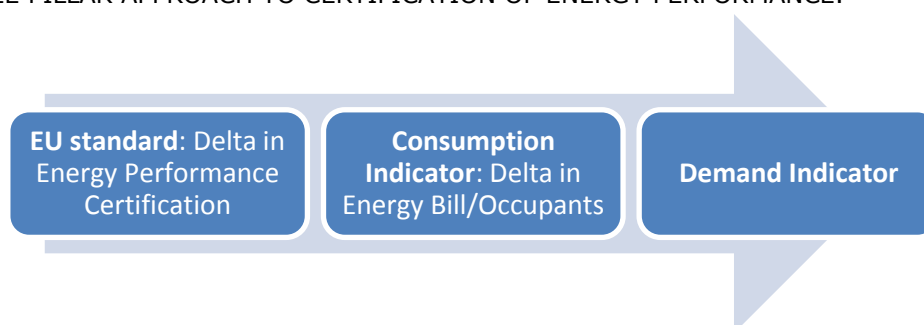
- The passport includes tailor-made improvement recommendations, incl. comfort information, financial planning incl. subsidies, asset valuation, etc.
- The passport is supported by a thorough analysis of the building and facilitates the choice of solutions applicable in each case. In the French example (P2E), the passport develops possible energy work packages to achieve a targeted level of performance (e.g. Class A or B) and possible practical steps to implement them. The proposed predefined “combinations” of measures facilitates the selection of packages of measures according to the building type, age, etc.
- The passport is there ensures that the energy improvement considerations are well integrated each time works are being undertaken in a building. Having realised a passport would be a prerequisite to obtain subsidies or any financial or fiscal support for renovation.
- The passport looks beyond the specific measures; it integrates a project management side in a collaborative manner. The passport tool, e.g. a web platform, is meant to be accessible to the owner, to the auditor and all professionals associated with the individual renovation project.

An energy property passport as such will allow the creation of a track record for EE which would be useful for the financial industry, valuers and the building sector, and valuable for mortgages, covered bonds and securitisation. It is also complementary to the important work of the valuation profession in recognising the “green value” of energy retrofitting through access to validated information documenting the EE improvement and interventions carried out on the property.

The Project anticipates the use of a **three pillar approach** to the assessment of the actual energy performance improvements:

1. Energy Performance Certificate (EPC): EPCs are now required for the construction, sale or letting of buildings across the EU in order to provide a basic rating of a buildings’ energy performance.
2. Additional Data to Predict Energy Use (‘Consumption Indicator’): Numerous studies have looked at what available data can be added to EPC data to improve the reliability of predictions regarding energy.²¹ Interrogating this area will include looking at the use of energy bill data from the property.
3. Actual Energy Use Data (‘Demand Indicator’): Recent developments in the IoT (internet of things) coupled with the roll-out across a number of EU Member States of smart meters, mean that it is realistic to believe that in the future it may be possible to provide a real time view on the performance of the property. This can be applied before and after renovation, using a mix of sensor technology and machine learning algorithms. Such an approach would give an accurate and on-going view of the performance of the property itself, which is the ideal scenario for investor confidence.

FIGURE 5: THREE PILLAR APPROACH TO CERTIFICATION OF ENERGY PERFORMANCE.



²¹ Sources:

- The role of energy bill modelling in mortgage affordability calculations, UK-GBC and UCL, 2015 - *EPCs & Mortgages*
 - Demonstrating the link between fuel affordability and mortgage lending, Wales Low Zero Carbon Hub, 2015

The cost of such an assessment would need to be factored in, and is likely to be in the region of £120 (€140) for a single family home (using the UK Green Deal Energy Efficiency assessment cost as a benchmark²²). Updating the way EPC assessments are carried out implies the need to make alterations to training/certification requirements of the professionals carrying them out. As such, assessors will likely need to provide assurance to the valuer/lender of the energy class the property will achieve, in particular where they are SMEs, this will have implications for the sort of insurance products available to SMEs to back such claims.

Importantly, setting the metric, and value, at this level will bring the **mortgage industry in-line with the EU on energy**, and helps create a critical mass around the nationally determined energy demand levels.

In order to ensure expertise and to avoid additional administrative costs and burden for banks, the evaluation of the improvement of the energy efficiency of the property based on the three indicators would be delivered by external/third party providers for a fee.

It is not intended to create an independent and separate labelling scheme as this would add to the complexity an already complex market for building labelling, but rather provide a framework to enable existing labelling schemes to show compliance with the indicators decided upon by the project. Namely for (a) existing EPC assessors to include additional data to demonstrate compliance and (b) existing building labelling schemes to align assessment with the indicators to demonstrate compliance.

The creation of this framework, linking preferential financing conditions with the need for real energy performance data, is expected to positively impact on the market's ability to provide such performance data. As noted in research on the role of energy bill data in mortgage affordability calculations: "lenders could play a role in helping to raise the profile of EPCs in property transactions, creating a virtuous circle that would see their accuracy – which is currently variable – improve over time."²³

It is also anticipated that a standardisation of energy indicators with the mortgage market, equal to 53% of the EU's GDP, will encourage important technological innovation within the field of energy efficiency which can assist in bringing the mortgage market more in line with the EU's 2020 and 2030 energy targets.

Moreover, if governments wanted to further drive thermal renovation and uptake of such mortgages, it would be possible to consider complementary interventions, such as a variable tax rate for the purchase of properties based on the energy efficiency of the property.

C. "Green value" and property value

Energy efficiency is being increasingly recognised to enhance and complement the traditional factors driving a property's economic value, financial risk and performance, although it varies significantly according to different properties and markets. While the link between sustainability and market value has received considerable attention by research communities in recent years, the interpretation and practical applicability of this work by valuation professionals has been limited so far due to a lack of granularity and geographical coverage. The existing studies only focused on certain property types in geographically limited areas and never on a larger market. The reports are merely one-time snapshots of narrowly defined market segments. Given the proposed standardised data collection framework, the Project could have a much broader market penetration as well as a more continuous approach to capturing green value in real estate markets.

EE indicators and certificates alone are not sufficient basis to accurately estimate market value and assess credit risk. Indicators and certificates capture various aspects of how the building performs from an environmental point of view, but not how the market responds to such performance, therefore they are a few

²² <https://www.uswitch.com/green-deal/guides/green-deal-assessor>

²³ The Role of Energy Bill Modelling in Mortgage Affordability Calculations, UK Green Building Council and University College London, 2016

steps away from offering insights about financial performance, value and credit risk. The purpose of a valuation, in this sense, is to provide a market value which accurately reflects the future benefits of a property.

The accuracy of the valuation will depend on:

- the ability and skill of the valuer to recognise the factors that determine the appropriate value;
- the use of international valuation standards and guidance;
- the availability of reliable, comparable and consistent data.

Whilst conventional market-based valuation methods (e.g. discounted cash flow or comparison method) are fit to account for EE features in valuations, there is, to date, limited quality rental and sales evidence to allow valuers to accurately determine the incremental value impact. As the IMMOVALUE and RenoValue EU projects have demonstrated, the lack of robust, reliable and accessible data is the single most important barrier to establishing the linkages between buildings' energy performance and value. The lack of market data is a critical constraint that can only be addressed over time.

This Project could be a significant trigger point and opportunity to overcome this deficiency by building up an evidence base and by explicitly instructing banks and their valuers to request, collect and make the most out of the additional data. Consequently, the inclusion of energy efficiency and sustainability aspects within the property rating system and for determining loan conditions will motivate those seeking a mortgage loan to provide this information to the bank in order to benefit of a better interest rate or higher LTV. This entails market participants in need of financing to pay more attention on data handling and recognise the value of reliable and up-to-date building information. This incentive chain for the supply and demand for building information will contribute to a much needed real estate market transparency.

D. "Data warehouse"

To support and oversee the retrofitting conducted both in terms of the improvement made to the property and the underlining data collected, the initiative will be further supported a **"data warehouse"** intended to: (a) establish the correlation between EE and borrowers' probability of default and LGD, and (b) clearly register and record the link between property, energy rating and loan performance, so that these assets can be identified for "green" funding purposes. Gathered market data on actual financial performance of energy efficient mortgages would be processed through the creation of a common and central data warehouse, and analysis in order to validate the correlations as describe above. Results of the analysis will be made available to the public free of charge.

The EMF-ECBC has extensive experience of market-led initiatives driven by data collection and presentation. In 2012 the EMF-ECBC created the **Covered Bond Label**²⁴, which is a market-led transparency initiative which has improved and facilitated further convergence of covered bonds best practices. The Covered Bond Label has enhanced significantly the level of transparency of covered bond markets in Europe and around the globe by facilitating and improving the access to information on i) liability, ii) regulation and iii) assets and regulatory compliance in a harmonised way.

E. National/ International Projects Linked to the Aim of the Initiative

This Project also aims to build on state of the art work across Europe on the integration of energy performance data into mortgage affordability calculations and valuation practices, and to build an energy efficiency market that mobilises new forms of investment. This includes:

²⁴ <https://coveredbondlabel.com/>

- **RenoValue:** An H2020 project to train valuation professionals to take into account the energy performance of buildings in valuation, led by RICS and partners and involving WorldGBC on its Steering Committee.
- **ReValue:** An H2020 project aiming to lead the development of appraisal norms and standards that recognise energy efficiency value in social and private residential real estate.
- **Build Upon:** An H2020 project to design national renovation strategies in 13 countries, run by the Europe Regional Network of WorldGBC. The innovation incubator within the project has supported the design of a green mortgages project concept and the incubator process has helped prepare national energy efficiency stakeholders in over 15 countries prepare to engage in project implementation.
- **LENDERS:** The UK based "LENDERS" project will build the evidence base for using more accurate estimates of energy bills in mortgage affordability calculations. If successful, this could allow higher lending for more efficient properties and eventually lead to a greater link between efficiency and property value.
- **RentalCal:** An H2020 Project which key ambition is to improve market transparency for energy efficiency investments in the rental housing industry. It does so by providing a benchmarking tool for transnational profitability assessments of such investments.
- A '**Global Alliance for Building and Construction**' was also launched at COP21 by France, UNEP, 19 other countries (including Austria, Germany, Finland and Sweden) and global actors in the sector, with EE renovation as one of its key objectives. The Alliance brings together major international organisations to support public and private sector action in the sector, including founding alliance partners RICS and the World Green Building Council – and 'Finance' is one of the major support work streams organisations have signalled support for. This alliance can be used to help amplify and disseminate the work of this project globally.
- **SEI METRICS:** An H2020 project which aims to address the lack of investment in sustainable energy and energy-efficient assets from public and private financial institutions.

IV. EXCEPTED IMPACTS

The concept and methodology of the Project, and the number and range of stakeholders involved (see management structure below) in the undertaking means that the initiative has the potential to bring a **transformative change** with regard to the energy efficiency of the EU's housing stock, the financing of energy improvements and, ultimately, the EU's energy consumption.

The Project is intended to deliver several important outcomes:

- A standardised approach to the financing of EE investment in properties;
- A framework for the robust and accurate measurement of EE improvement;
- The conditions and framework required for valuers to take account of EE features in valuations, including instructions from lenders.
- The correlation between EE improvements and lower probability of default of borrowers.

Together, these outcomes are expected to significantly impact on investor confidence and behaviour by increasing certainty as regards energy efficient investment. For the purposes of this Project, investor should be understood from two different perspectives, underlining the significance and extent of the Project:

- *Microeconomic perspective:* individual consumers as investors in residential property and as retail investors in bank securities; individual consumers in terms of their awareness of energy consumption and understanding of energy related data;
- *Macroeconomic perspective:* banks as providers of energy efficient mortgages (as a form of investment) and institutional investors, such as banks, insurance companies and pension funds, in covered bonds.

V. MANAGEMENT STRUCTURE

Body	Role	Composition
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Finance and Banking Needs Committee	Identify the necessary requirements to incorporated "green value" into the banking industry	Financial experts from the mortgage and covered bond industries
Energy Efficiency Committee	Provide a definition of "energy efficiency mortgages" and identify the requirements to measurement EE improvement	Technical experts from the financial industry and energy efficiency
Valuation and Data Committee	Provide metrics on quantitative market analysis	Technical experts from the valuation profession and buildings industry
Advisory Council	Provide regulatory and policy guidance on the key elements of the initiative and insight into the requirements needed to trigger institutional support	Representatives from the World Bank, EU Commission (DG innovation, Energy & FISMA), ESRB, ECB, EBA, ESMA, BCBS, UNEP-FI, EIB, EBRD)
Steering Committee	Decision body to update the initiative on a quarterly basis.	Representatives from the technical committees and consortium members.

- *EU Horizon 2020 Funding Consortium*

Organisation	Description	Role to be played
EMF-ECBC Contact: Luca Bertalot	The European Mortgage Federation (EMF) is the voice of the European mortgage industry, representing the interests of mortgage lenders and covered bond issuers at European level. The European Covered Bond Council (ECBC) is a platform that brings together covered bond market participants.	Experts on mortgage origination and covered bond funding, extensive experience of successful, pan European market initiatives, significant industry mobilisation and implementation capacity
Royal Institution of Chartered Surveyors (RICS) Contact: Zsolt Toth	RICS is a professional body that accredits professionals within the land, property and construction sectors worldwide. They promote educational and professional standards and provide impartial advice and guidance.	Experts on valuation and extensive experience with the identification of how to integrate and recognise energy efficiency in valuation.
World Green Buildings Council (WGBC) Contact: James Drinkwater	WGBC is a network of national green building councils in more than 75 countries, and 27,000 corporate members, making it the world's largest international organisation influencing the green building marketplace.	Experts on issues of energy efficiency and knowledge about metrics of how to measures energy performance of buildings.
Ca' Foscari University Contact: Monica Billio	Università Ca' Foscari Venezia is a leading Italian university in Economics and Management, Humanities, Languages and Literature, Science	Experts on economics and risk measurement and have extensive experience with managing EU Funded research projects.

<p>SAFE Goethe University Frankfurt Contact: 'Loriana Pelizzon</p>	<p>The department of Sustainable Architecture on Finance in Europe (SAFE) at Goethe University is dedicated to research and policy advice in the area of finance.</p>	<p>Experts in providing comprehensive analysis of all aspects of modern financial markets by way of an interdisciplinary approach encompassing financial economists, micro- and macroeconomists and legal academics.</p>
<p>E.ON Contact: Marco Marijewycz</p>	<p>E.ON is the largest energy company in Europe and is focussed on providing solutions for the new energy world</p>	<p>Experts on energy consumption. With over 25 million customers across Europe E.ON has access to energy data and knowledge about consumer energy behaviour.</p>

- *Planned Workstreams*

Objectives of Work streams 1-5:
<p>Work stream 1: Identification and summary of market best practices</p>
<p>Work stream 2: Identification and calibration of energy indicators for measurement of energy efficiency improvement</p>
<p>Work stream 3: Identification of pre-requisites for the assessment of “green value” and “brown discount”</p>
<p>Work stream 4: Substantiation of correlation between energy efficiency & probability of default via portfolio analysis</p>
<p>Work stream 5: Definition and design of energy efficient mortgage, based on preferential financial conditions</p>

Annex I – Horizon 2020 Funding Opportunity

EE-24-2016-2017: Making the energy efficiency market investible

Specific Challenge:

Sub-optimal levels of investment in sustainable energy (in particular energy efficiency) are linked, among others, to a lack of trust of investors and financiers in the financial viability of energy efficiency measures. Banks, institutional investors and asset managers lack the skills and operational tools to effectively assess sustainable energy investments and integrate energy efficiency in their investment strategies. Access to the capital markets for energy efficiency investments is hampered by the lack of standardisation of assets.

Scope:

Proposals should address one or more of the following issues:

- Development, demonstration and promotion of frameworks for the standardisation and benchmarking of energy efficiency investments such as labelling schemes, project rating methodologies and risk assessment tools, standardised legal and financial structures of assets (loans, guarantees, energy performance contracts etc.) in order to develop securitisation and rating models for energy efficiency based financial products, which should enable the development of and access to secondary markets. Proposals integrated in a broader approach such as socially responsible investment should focus on the energy component.
- Gathering, processing and disclosing large-scale data on actual financial performance of energy efficiency investments, in order to create a track record for energy efficiency in different sectors (buildings, industry, transport, etc.). Further integrating the 'green value' of buildings in property valuation through collection of market data across the EU and actions targeted to the key actors in the sale or lease process (e.g. real estate agents, property valuers, notaries, etc.)
- Targeting institutional investors (e.g. public pension schemes) in order to increase the share of their funds invested in energy efficiency, or to develop specific funds or investment products. Supporting the integration of energy efficiency in portfolio management strategies for institutional investors and/or fund managers, including through re-definition of fiduciary duties.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 million and EUR 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

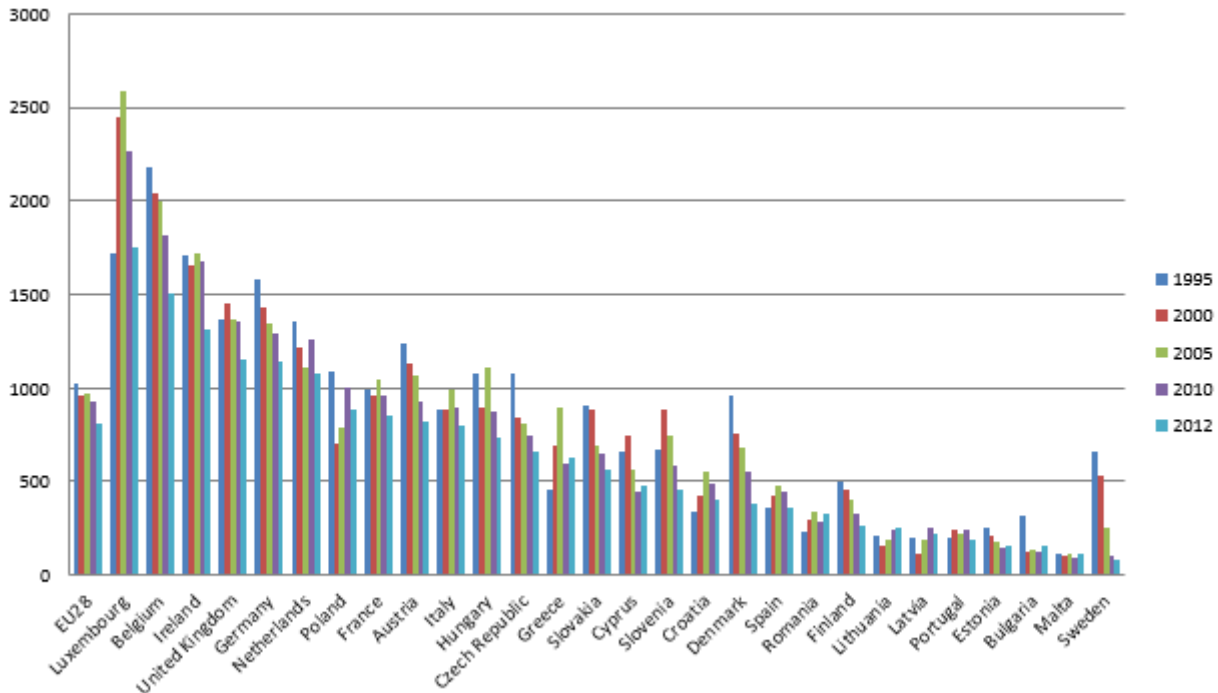
Expected Impact:

Proposed actions are expected to demonstrate the impacts listed below (wherever possible, use quantified indicators and targets), depending on the activities of the proposal:

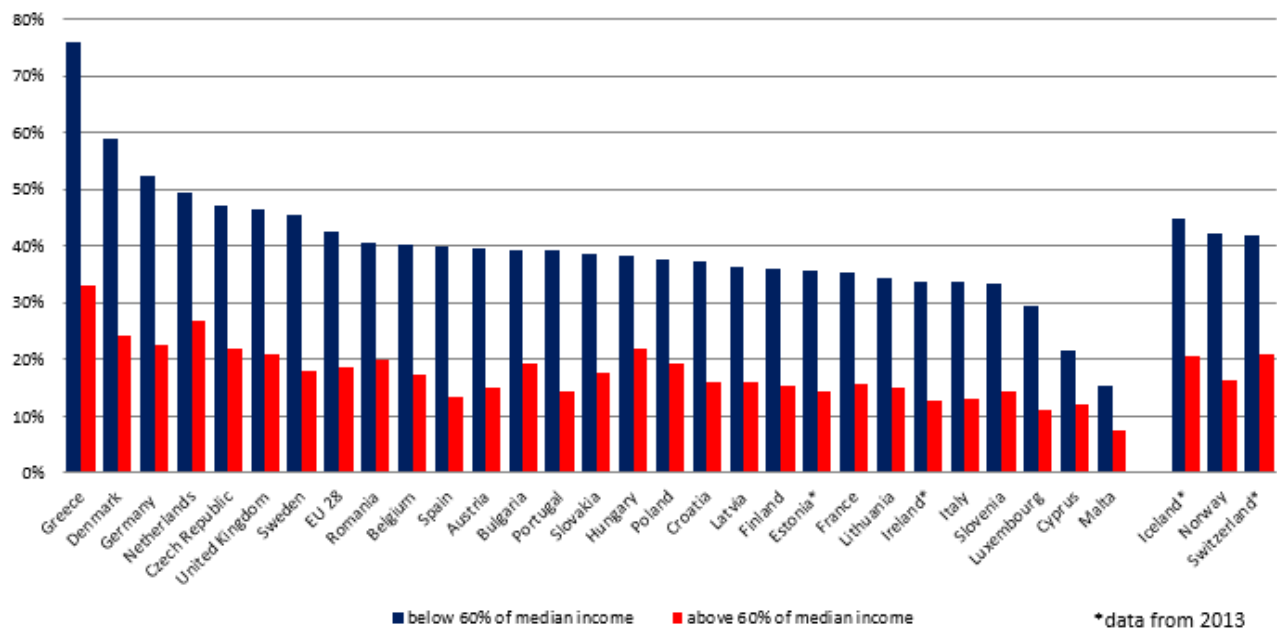
- Reduced uncertainty as regards investments into energy efficiency and increased investors' confidence;
- Frameworks, standardisation, benchmarking, standardised descriptions and data evidence of financial returns of energy efficiency investments agreed and accepted by the market;
- Higher allocation of institutional investments to energy efficiency; standardisation of assets enabling securitisation; development of a secondary market for energy efficiency assets.

Annex II – EMF-ECBC Explanatory charts

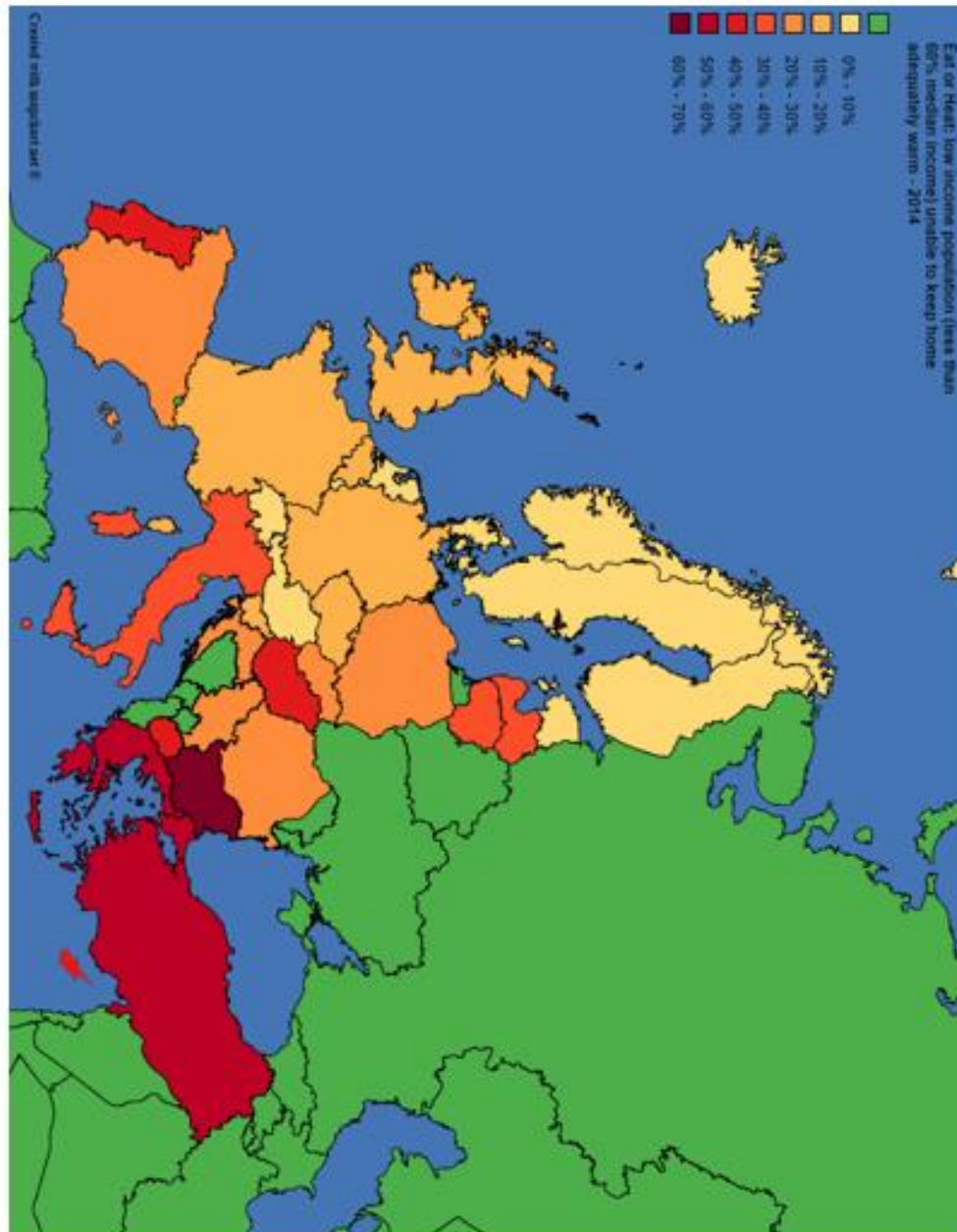
Co2 emissions per capital per year for housing in kg



Share of housing costs in disposable income, by income group (2014)

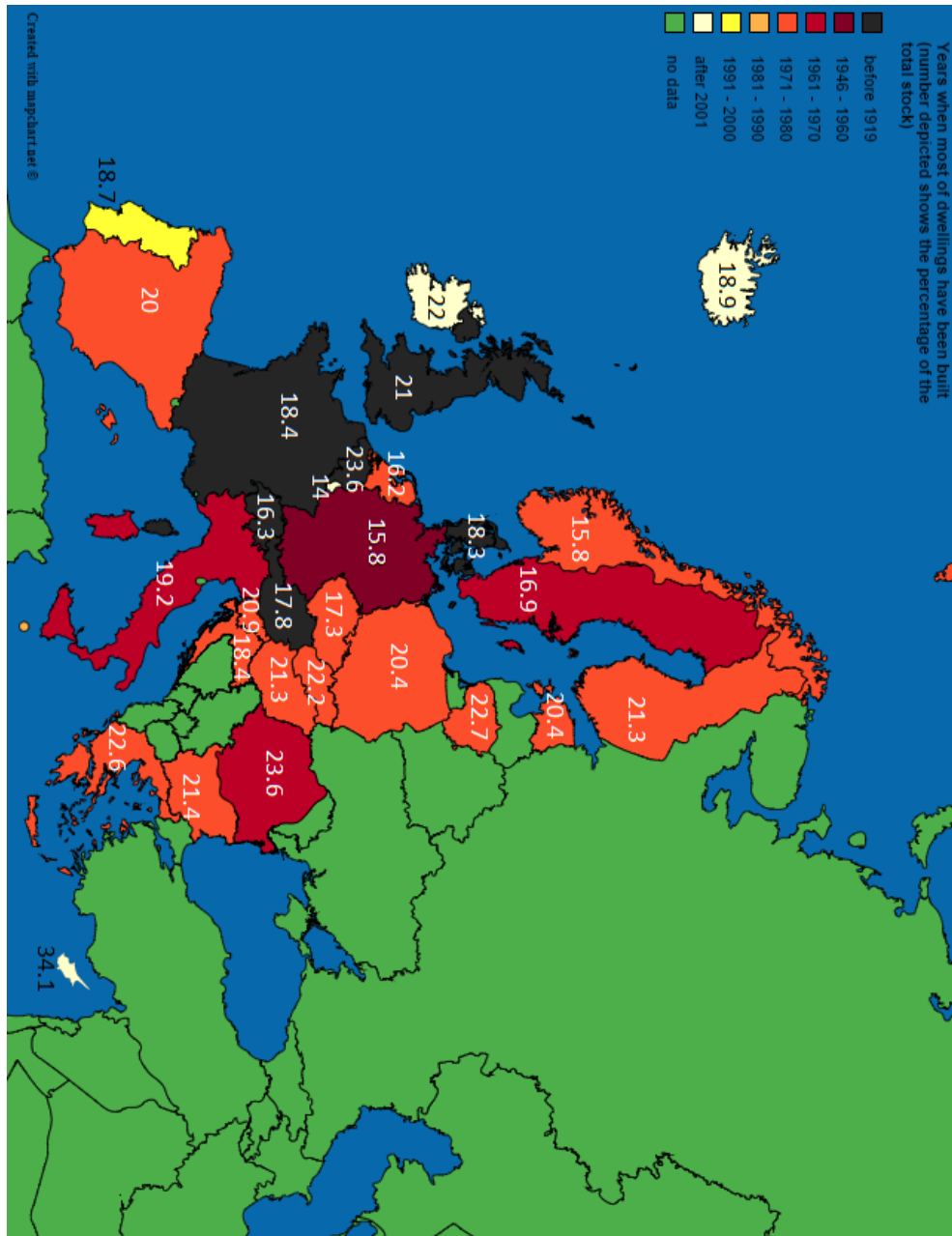


Heat or eat dilemma



Source: SILC Eurostat

Age structure of dwellings in Europe



Source: Eurostat, Census 2011

- The housing stock age structure in Europe is varied and it is impossible to identify common traits.
- This map depicts decades during which most constructions were built in each MS together with % built in that period with respect to the total stock.