Financing Mechanisms for Europe's Buildings Renovation

Assessment and Structuring Recommendations for Funding European 2020 Retrofit Targets

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Executive Summary

A review of recent research shows that from both policy and financing perspectives, Europe is delivering energy efficiency retrofit activity rates below 50% of those required to meet the buildings component of its energy efficiency goals for 2020. Indeed, research also suggests that the present rate of energy retrofit and refurbishment of European buildings is sub-optimal from economic, strategic and environmental perspectives.

Appropriate national policy frameworks remain the most significant drivers of optimal national energy efficiency and refurbishment outcomes, however there is also a clear need to create mechanisms and support programmes which have the absolute financing capacity to stimulate investments in the order of Euro 100 billion per annum into European buildings in aggregate from public and private sources (consistent with individual Member State target financing levels of 0.5-0.8% of GDP[1]).

While we believe that it is essential that new energy efficiency financing instruments aim at the better and more effective engagement of third party co-funding, we also think that economic subsidy is a necessary requirement to achieve a national optimal retrofit portfolio as the national Government is the only stakeholder who, at present, can perceive the wider scale macro-economic and strategic benefits and value the emissions reductions resulting from the energy savings delivered by retrofits.

Government's role is central in bridging the policy and funding gap through the structuring and catalysing of solutions which involve banks, energy suppliers, ESCOs and other distribution agents to efficiently connect the low cost, broad-scale debt capital markets with the specific deal economics and co-benefits for the retrofit customer (in most cases the Building Occupier).

We identify and examine two countries (the UK and Germany) whose current and future disbursement structures and associated policies have successfully engaged banks and energy suppliers respectively as distribution agents, and also have the potential programme capacity to reach the absolute funding amounts forecast for their optimal national energy efficiency retrofits. We also identify EU level funding sources (such as the EIB's ELENA programme) which can play an increasingly instrumental role in establishing the essential structures, processes and criteria to enable public bodies to confidently accelerate the energy efficiency retrofit of public buildings and design programmes to engage new private sector financing sources designed using the best practices and tested components already visible in existing successful models. The common theme among these programs is their ability to lever significant amounts of private capital investment in buildings energy efficiency refurbishment ("the waterfall effect").

To unlock the significant amount of private sector financing which is required to deliver an optimal European outcome for energy efficiency retrofits in buildings we employ a simplified framework to highlight four key policy gaps. Once identified and prioritised, we describe a series of complimentary policy options which we believe can substantially resolve them.

Finally, we conclude with what we believe to be the critical components and mechanisms that can be quickly rolled-out across Europe to more than double the financing which is presently deployed into the energy efficiency refurbishment of European buildings.

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Financing Needs for European Buildings

Europe has an established goal of cutting its annual primary energy consumption by 20% by 2020 and expects that such energy savings will reduce its CO_2 emissions by 780 million tonnes and save c. €100 billion in fuel costs[2] per annum. Buildings are responsible for 40% of final energy use in Europe, making them a core component required to meet this goal, and the European Commission estimates that up to 2 million jobs can be created or retained because of energy efficiency[3].

Europe's 2020 energy savings target was conceived in its 2005 Green Paper on Energy Efficiency and was confirmed in subsequent Action Plans and Council Decisions. In June 2010, the target was adopted by the European Heads of State and Government (the European Council) as part of the new 'Europe 2020' strategy in the context of which the EU Commission recently adopted the Communication "Energy Efficiency Plan 2011" on 8th March 2011. This new Energy Efficiency Plan 2011 recognises that the EU "is not on track" to fully realize its cost-effective energy savings and needs to "double its efforts".

Work by Ecofys and the Fraunhofer Institute[4] suggests that the EU policies which have been adopted since the publication of Europe's 2006 Energy Efficiency Action Plan will leave a gap of around 208 Mtoe to the EU target by 2020 and that closing this gap requires a *threefold* increase in policy impact. With a net oil price of € 52 per barrel, the study values the increased savings "not spent on energy" which would result from closing this gap at € 78 billion annually by 2020, equivalent to 560 Mt of reduced CO_2e emissions.

The dual causes of Europe's insufficient progress are regulatory failures (such as lack of comprehensive policy frameworks, poor enforcement and low levels of ambition) and market failures (such as insufficient price signals, split incentives, asymmetric information, missing or incomplete markets and high initial costs). In the specific context of commercial and residential retrofits, the Commission also sees increased measures on financing as "essential to tackle the serious limitations on the availability of liquidity for high upfront costs". Furthermore, EU level resources are seen as providing risk-sharing, project guarantee support and the better engagement of third party financing as well as the provision of more technical assistance to Member States and local authorities.

Clearly addressing regulatory failures in the absence of a focus on market failures and financing is sub-optimal and is as likely to underperform as purely addressing market failures and financing without an appropriate and supportive policy framework. We strongly believe that appropriate regulatory action and policy making requires an accurate view of the size of the financing needs for European buildings and a clear pathway towards securing them in the timeframe required. Without the adequate mix of public and private finance we will certainly not see Europe's targets being met.

While there are many regulatory proposals aimed at filling the policy gap identified by the Energy Efficiency Plan 2011, there have been fewer attempts made to quantify and resolve the commensurate and considerable financing gap. Our research has identified three complimentary methodologies which allow us to determine an "order of magnitude" investment capital figure for European buildings which, through the use of existing successful national financing models, allows us to develop a European financing framework which can scale to deliver levels of national retrofit activity required to meet Europe's 2020 energy efficiency targets.

We have identified three complimentary approaches that can be used to estimate the amount of investment capital required consistent with a European Building Renovation consistent with its 2020 targets:

1 - "Bottom-up" Approach:

EuroACE[5] states that the rate of European retrofitting consistent with 2020 targets is 5 million deep interventions per annum. Depending upon required investment capital per intervention (Euro 10,000 – UK example – through Euro 36,000 in Germany) this gives an annual European investment capital budget range of Euro 50 billion to Euro 180 billion.

2 - "Top-down" Using the IEA's 2050 GHG targets:

Houser et al[6] use a World Business Council for Sustainable Development (WBCSD) model to assess the amount of investment required to achieve the building-sector emission reductions called for by the IEA[7], the resulting energy cost savings, and the abatement cost of these investments across various geographic regions. This gives an annual investment figure for buildings in the EU27 countries of US$ 158 billion (Euro 110 billion) each year until 2050.

3 - Procurement and Development Cost Approach:

Barclays[8] has developed a demand-driven model using estimates of the adoption rates of 40 commercially viable Low Carbon Technologies (LCTs) on a per country basis to derive a total cost of LCT adoption for Europe by 2020 (Euro 2.9 trillion) within which buildings require a total 2011-2020 procurement and development cost of Euro 600 billion (approximately Euro 67 billion per annum).

The average of the above four data points indicates that the appropriate "order of magnitude" investment required in European buildings between now and 2020 is Euro 100 billion per annum. In the context of the EU27 2010 gross GDP figure of Euro 12 trillion[9], this implies an approximate annual investment into energy efficiency in buildings on average per country of just over 0.8% of gross GDP to deliver Euro 100-150 billion[10] in annual savings by 2020.

These figures are broadly consistent with McKinsey's conclusions from Energy Efficiency work focused on the capture of NPV-positive savings in the USA: Their study[11] concludes that, at a minimum, the US should be investing approximately $67-79 billion[12] (c. 0.5% of US GDP) per annum in buildings energy efficiency measures. While as a percentage of GDP this is slightly lower than the European equivalent, these investments do not contain any monetary value attributed to the CO_2 emissions reductions nor any of the "indirect benefits" of buildings retrofit activity whose inclusion would support higher investment figures.

Finally, the above also coincides with the UNEP's 2010 research[13] which calls for an annual investment of $308 billion in green buildings globally (0.5% of 2010's global GDP) until 2050.

2

Existing Financing Mechanisms

In 2010, EuroACE[14] identified in excess of 100 financial or fiscal instruments which were in place across Europe and which represented "a total investment of the order of tens of billions of Euros". The work goes on to provide analysis of 30 comparable core instruments which fall into eight categories: Preferential Loans, Subsidies, Grants, Third Party financing, Trading (White/Energy Certificates), Tax Rebates, Tax Deductions and VAT Reductions.

Before discussing the relative merits of the instruments, it is important to consider that, independent of the instrument, the investment capital for Europe's buildings renovation will come from just six sources: Government, Building Owner, Building Occupier, Bank, Renovation Contractor[15] or Energy Supplier. The amount of capital that is made available by each of these sources to renovate Europe's buildings depends upon three factors:

1 - the source's access to and cost of funds;

2 - its perception of the risk/ return characteristics of the renovation investment and

3 - other competing investment priorities.

When assessing each financial instrument and associated regulatory policies it is important to determine on which financing source it is designed to act and how it impacts that source in each of these three areas.

Aside from being a significant direct investment capital provider (through subsidies and grants), and indirectly through fiscal measures, Government – through appropriate policies - can significantly impact each of the private sector funding source's investment priorities, perception of the risk/ return characteristics of the investment and potentially also access to and cost of funds.

In fact, we argue that one of the most important roles for Government policy is to lever private capital to invest alongside its own in orders of magnitude which reach 0.5-0.8% GDP every year from now until 2020. This concept was recognised in Europe's Action Plan for Energy Efficiency (2007-2012) - COM(2006) 545 which called on the banking sector to offer energy efficiency financing opportunities, European investment institutions to facilitate public-private partnerships and set a goal for the Commission to remove national legal barriers to shared savings, third-party financing, energy performance contracting and recourse to businesses providing energy services. However, with today's renovation investment capital flows from all sources (public and private) in Europe being several factors below our projected target requirement of Euro 100 billion per annum, it is clear that new policies, together with stimulative public funding programs designed to lever and engage with private sources, are required.

Case Study: Germany and the KfW

Arguably, Germany has been one of Europe's most successful countries in stimulating deep energy efficiency refurbishments. Germany has achieved impressive co-financing ratios of public to total funding for energy efficiency retrofits which started at 1:4 until 2006, and subsequently increased to 1:9 through the introduction of new programs coordinated by state bank KfW, which with €6 billion of federal funds was able to deploy €27 billion of energy efficiency investment through program activity[16] stimulating a total public and private investment flow totalling €54 billion. This "waterfall effect" was created through several positive design features of KfW´s programmes including their deployment through the networks of private banks ensuring broad reach, levering banks´ retail transaction processing capacities and their subsidized 2.75% interest rates.

German Case Study*

Germany has 39 million homes of which 75% were constructed before 1979, prior to the introduction of higher energy savings standards. Germany currently refurbishes around 200,000 buildings a year (equating to c. 400,000 homes) and to date has retrofitted 9 million units to high energy-efficiency standards. Existing German homes use around three times more energy for heating than new buildings and energy efficiency investments in deep retrofits have halved the energy use in the buildings treated by KfW since 2002.

From 2001–2006, the German Alliance for Work and Environment was very successful in using subsidies to stimulate private sector finance: $5.2 billion of public subsidies stimulated a total investment of $20.9 billion in buildings retrofits creating or maintaining some 140,000 jobs. In addition, the coalition believes around $4 billion of the government input was recovered through tax and needs for unemployment benefits was averted.

From 2006-2009, KfW's financing activities across various programs deployed €27 billion in loans and grants leading to a total investment in energy efficient homes of more than €54 billion. KfW's funding has enabled the energy efficient renovation of 1 million homes, and the building of 400,000 new highly efficient homes, and is credited with the creation of 240,000 new jobs per year in the building and building supply-related industries.

Building upon this success, Germany is looking to double its historic energy efficiency activity rates to meet its current refurbishment targets.

Germany targets an increase in the refurbishment rates of its buildings to 3%, around a million homes per annum. With an observed average Euro 36,000 investment per home, this implies a total annual investment of Euro 36 billion (or 1.4% of German GDP). Finally, research from one of Germany's leading real estate consultants, THP, estimates that the total investment required to bring German housing into line with new building standards is Euro 1,100 billion[17].

Case Study: The UK's Green Deal and Green Investment Bank

In the UK starting in 2012, the "Green Deal" anticipates the retrofit of over a million homes per annum. The Green Deal looks to provide a maximum of £10,000 investment capital per intervention and is expected to deliver aggregate investment in the region of £7bn–£11bn per year[18] (0.5-0.7% of UK GDP) over 15 years, a major ramp up from existing UK Energy efficiency investment of £1–2bn per year.

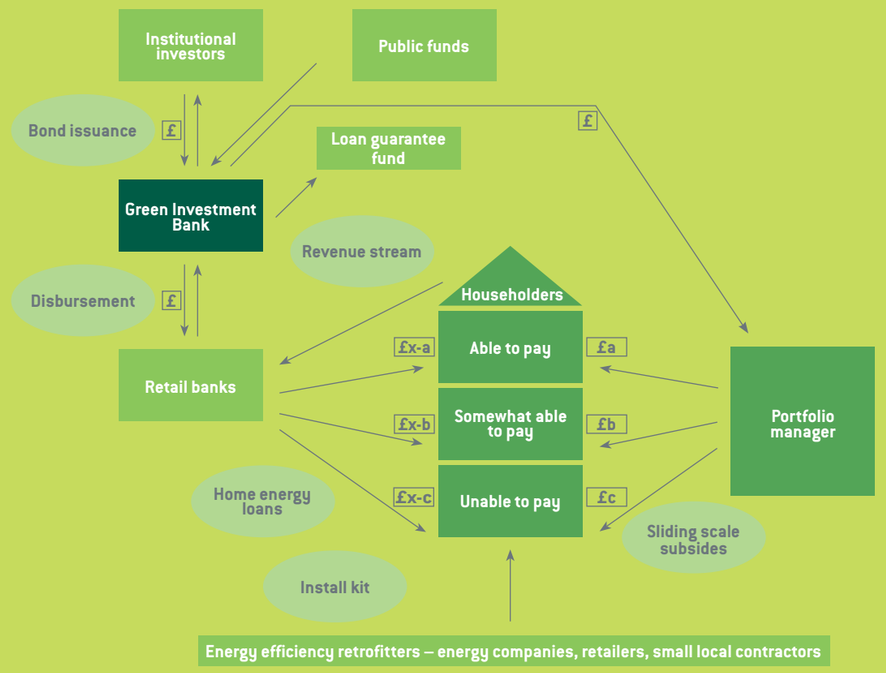
Green Deal financing comes within a proposed package of policy measures in the UK's Energy Bill 2011 designed to tackle the key barriers to energy efficiency investment. As in Germany, UK policy makers have recognised that the provision of energy efficiency refurbishment finance alone will not stimulate the level of retrofitting required and therefore propose a series of complimentary policies including: An Energy Company Obligation (ECO) to align incentives of energy suppliers with customer demand for efficiency, improved Energy Performance Certification, accelerated Smart meter roll-out, access to energy bills for repayment of Green Deal loans, removal of credit provision restrictions for energy suppliers and improve access to data to stimulate competition among Green Deal distributors and finance providers.

The UK's Green Investment bank (GIB) anticipates an initial capital allocation of £3 billion from the UK Government which it

UK Case Study**

With the announcement of its "Green Deal" the UK government recently made the significant commitment to upgrade the energy efficiency of up to 14 million British homes by 2020, with 7 million having been offered a deep, whole of house retrofit. To date, the UK has provided direct subsidies of up to £3,500 to 2 million low income households under its Warm Front programme and, starting in 2008, it introduced a white certificate program (CERT) requiring domestic energy suppliers to make CO_2 savings investments in their customers´ properties which has generated a further £5.5 billion of retrofit investment. Finally, in 2010, the UK Government introduced the CRC Energy Efficiency Scheme which requires all sizeable, non-industrial energy consumers to adopt energy efficiency targets under a cap and trade scheme linked to CO_2 reductions.

The UK is also in the process of creating a Green Investment Bank to promote low carbon investment including offshore wind and energy efficiency. The following chart illustrates how the UK's GIB could pursue a role similar to Germany's KfW in the promotion of retrofit investment schemes:



Source: Green Investment Bank Commission Report

anticipates to catalyse a further £15 billion of green infrastructure investment over four years[19] (an initial 1:5 leverage ratio). In the context of energy efficiency finance, and using KfW's achievements as a reference, authors see no reason why the UK's GIB could not reach leverage ratios for retrofits of 1:9 given the risk characteristics of home refurbishment as compared to offshore wind project finance.

By way of comparison, the European Investment Bank (EIB) maintained a committed capital to total operations ratio of 27% in 2010[20] (almost 1:4) however it targets further leverage ratios of between 2x and 25x of additional co-funding or private sector activity resulting from its actions. Notably EIB energy efficiency programmes JESSICA and ELENA have targets of 20-25x leverage.

3

Funding the Gap

To meet Europe's 2020 targets, the amount of additional financing required from all sources, public and private, for energy efficiency retrofits in buildings is over Euro 50 billion annually. To fill this gap, we believe that Member States' energy efficiency refurbishment policies and programmes should focus on three areas:

1 - The removal of regulatory and non-economic hurdles[21];

2 - The alignment of the economic interests of the five principle non-Governmental financial actors: Building Owners, Building Occupiers, Banks, Refurbishment Contractors and Energy Suppliers in delivering target levels of retrofit activity; and

3 - The inclusion and adequate capitalisation of financing facilities structured similarly to those of Germany or the UK which can lever Member State public funding by factors of up to 10 times.

Value Framework and Economic Incentives

As our focus is finance, we have chosen to look in more depth at the alignment of economic interests in the context of a new value framework for the financing of energy efficiency, and not dwell on the critical - but non-financial - policies required to remove hurdles to greater activity.

To stimulate the maximum available financing for energy efficiency refurbishment activities, we believe that a clear investment and value framework is fundamental. In the context of a building retrofit, there are three key sources of value: Energy savings, implied emissions reductions and other material improvements (sometimes referred to as "co-benefits"). Refurbishment activity can be driven by any one, or a combination, of these three value sources: Energy savings (classic ESCO activity), implied emissions reductions (white certificate programs like the UK's CRC Energy Efficiency Scheme) or the other material improvements (eg. Commercial property refurbishments which include improved energy performance alongside a more sizeable general renovation).

The following table provides a simplified overview of the existing levels of retrofit engagement[22], in the absence of supportive policies, of our identified potential sources of new private sector finance with, in each case, potential ways to increase these levels of engagement:

	Energy Savings	Implied Emissions Reductions	Other Material Improvements	Engagement Score
Building Owners	1 Connect Building Energy Performance to Property Value and Establish Trans-parent Standards	0 Add Emissions Dimension to Energy Performance and Establish Transparent Standards	2 Material Improvements to Building Quality impact Building Value and Marketability	**50%**
Building Occupiers	2 Reduce the Risk of Retrofit Energy Performance and Lower Cost of Funds	1 Introduce White Certificate Programmes to Prioritize EE Retrofits	2 Material Improvements Make Building Occupancy More Appealing	**83%**
Banks	1 Improve Access to Low-Cost Financing and Engage as Distribution Channel for Retrofits	0 Make Emissions Reductions an Additional Source of Cashflow to Retrofit	1 Material Improvements Increase Building Value as Collateral	**33%**
Refurbishment Contractor	1 Capacity Building, Quality Standards, Accreditation and Energy Performance Based Contracting	0 Place a Value on Emissions Reductions and Integrate into Refurbishment Activity	2 More Other Material Improvement Increases the Scope and Size of the Refurbishment Work	**50%**
Energy Suppliers	0 Improve Access to Low-Cost Financing and Engage as Distribution Channel for Retrofits	1 White Certificate Programs and Placing a Realizable Value on Emissions Reductions	0 Potential to Stimulate Longer-term Customer Engagement	**17%**
Overall Driver Score	**50%**	**20%**	**70%**	

Table 1: Analysis of Economic Drivers for Each Potential Retrofit Funder

While these scores and policies are very general and simplistic, this high level view does indicate several key areas of focus which need to be addressed if policymakers wish to close the financing gap for optimal Energy Efficiency measures in Europe's buildings:

1 - **Building Occupiers** are the most economically engaged stakeholders, however they also are likely to have the highest cost of capital, shortest payback horizons, least access to capital markets and most limited financial collateral unless they are also the Building Owner.

2 - **Implied Emissions Reductions** provide very limited economic incentives unless they are specifically remunerated (by a Government initiative) or otherwise valued (or regulated) in the context of a white certificate programme.

3 - **In the absence of specific energy efficiency finance mechanisms and a supportive policy environment**, the entities with the largest balance sheets, most sizeable existing customer networks, most sophisticated billing and credit systems and low cost access to the capital markets (banks and Energy Suppliers) have the lowest overall financial incentives to engage in refurbishment activities.

4 - **In the absence of further policy support**, in many cases the strongest economic driver for buildings refurbishments are the "Other Material Improvements".

Unlocking Greater Amounts of Funding

These key features identified in the existing financial value-framework for energy efficiency renovations will lead to sub-optimal outcomes for Member States if they are not addressed by specific new policy measures on energy efficiency finance. The following are a series of remedial policy alternatives, corresponding to our four identified areas of focus, to address each and thereby unlock new sources of investment capital and improve the flow of financing into the energy efficient renovation of buildings in Europe:

1 - **Lower Cost and Better Access to Energy Efficiency Financing for Building Occupant:** To achieve lower cost financing and better access for the Building Occupant, the creditworthiness and security of the repayments to energy efficiency retrofits must be improved. This can be achieved in a number of ways:

a - **On-bill Finance:** Including energy efficiency retrofit repayments in energy bills (UK Green Deal) or property taxes (USA PACE programme) and attaching them to the property itself (as opposed to its occupant) raises the seniority of those payments (and therefore reduces their risk) and should remove them from the relatively high-cost world of consumer finance (bringing them more appropriately into the lower cost world of asset finance).

b - **Accreditation, Quality Assurance and Standards:** Ensuring that the energy efficiency retrofit work is undertaken by an accredited provider, meeting high quality standards (with strong warranties) through standardized contracts and procedures de-risks the investment in the resulting energy savings.

c - **Credit Support:** The commercial guarantees of ESCOs with large balance sheets, high credit ratings and solid brands makes energy efficiency retrofits more "bankable" as would the provision of various forms of credit support and enhancements from Government agencies directed at certain population segments or specific compliant retrofit activities.

2 - **Placing an Explicit Value on Implied Greenhouse Gas Emissions Reductions:** In many countries the only stakeholder able to perceive economic (and strategic) value from the greenhouse gas (GHG) emissions reductions resulting from greater energy efficiency retrofit activity is the State whose national emissions totals will decrease, whose net energy balance will improve and whose probability of reaching national emissions reductions targets increases. These nationally appreciated economic, and strategic, benefits of greater energy efficiency retrofit activity can also be transported into the private domain in a number of ways:

a - **White Certificate Schemes (Compliance or Cap & Trade):** White certificate compliance schemes have been widely used in the energy sector in Europe to integrate externalities and national targets into the activities of this highly regulated business and are already used in the US and several Member States to promote greater energy efficiency activity. A white certificate scheme with cap and trading has been introduced in the UK (the CRC Energy Efficiency Scheme) to provide a direct private sector price signal for the largest energy consumers related to the price of GHG emissions.

b - **Government Funding Schemes:** Directly or indirectly national governments can support energy efficiency retrofit activity in their built environment by placing an economic value on the greenhouse gas emissions reductions which result. If Europe targets Euro 100 billion energy savings and 780 million ton CO_2e emissions reductions annually by 2020, using a Euro 20 per ton CO_2e price the emissions reduction component is worth approximately 15% of the energy savings. This logic might therefore support the direct Government funding of up to 15% of the investment capital budget for its national energy efficiency retrofit activity purely in recognition of the value of the anticipated national GHG emissions savings.

3 - Greater Engagement of Banks and Energy Suppliers in Aggregation, Execution and Finance of Energy Efficiency Retrofits: The programmatic involvement of banks and energy suppliers in the massive distribution of energy efficiency retrofit solutions to their individual and commercial customers may simply be a matter of priorities: Do these entities presently have simpler, lower risk and more profitable products to offer to those same customers through those channels? In the absence of further policies and incentives the answer appears to be "yes"; potentially banks and energy suppliers have competing retail product whose customer demand, limited complexity and profit characteristics make them presently more attractive to sell to their customers than energy efficiency retrofit solutions. However, this situation is not static and these priorities can be impacted as follows:

a - De-risk the Underlying Transaction: Improving the transaction's creditworthiness, simplifying the contracting and repayment mechanisms and enhancing the quality of the execution of the energy efficiency retrofit (i.e. the policies outlined in 1 above).

b - Improving the Economics of Retrofits: The addition of value for the emissions reduced, imposition of a new CO_2 or energy tax (as raising the price of energy clearly improves the economics of energy efficiency) and the removal of distorting energy subsidies (like an artificially low retail energy tariff).

c - Co-financing or Risk Sharing in the Transaction: Government programs can part or fully finance energy efficiency retrofit transactions (eg. KfW and Green Deal), offer subsidized interest rates and placement fees to bank or utility distribution networks for sale and transaction processing services.

d - Significantly Increase Customer Demand: Retail distribution networks can be more "reactive" then "proactive" and hence the success of Government led education programmes, mandatory buildings energy performance certification, awareness campaigns and customer fiscal incentives should significantly increase customer demand and the size of the opportunity.

4 - Focused Public Investment in specific Capacity Building, Programme Design, Technical Support, Knowledge Sharing and Education: Significant work has been done by various countries and stakeholder groups to trial, prototype, pilot, test, assess, review and experiment with a wide variety of energy efficiency programmes, financial instruments and technology solutions for buildings retrofits. The following are a set of focused investment activities which we believe can significantly lever the additional public funds to be invested:

a - Production of "Best in Class" Guidelines and Templates for Specific Retrofit Activities: Member States should be encouraged and provided with financial incentives to copy "best in class" energy efficiency financing programmes, structures and approaches. Aside from broad-scale outreach, as illustrated by the KfW or Green Deal programs, to meet the objective of the energy efficient refurbishment of 3% of European Public Buildings per annum a significant amount of the existing experience should be recycled to provide education, guidelines and templates for public use to reduce the timeframes and costs involved in accelerating this key segment of the market. Best practice should be shared, along with forms of contracting, verification, tender process, counterparty selection, successes and failures to ensure that State, local and regional authorities have full access to appropriate detail to facilitate their confident execution of these programmes.

b - Increased Funding to support the Streamlining of Public Contracting and Processes, e.g. EIB's ELENA facility: The preparation, processes, contracting, monitoring and verification for energy efficiency retrofits of public buildings is important and is funding which receives good leverage ratios due to the subsequent investments provided by the winning ESCO and – in well executed tenders – a significant reduction in the friction costs borne by the tendering parties (due to standards and best practice sharing among the Government bodies consistent with programme goals). In addition, successful ELENA programme applicants can review complimentary EU funding sources to implement and co-finance other energy efficiency activities in parallel (eg. JESSICA, JASPERS, Municipal Finance Facility etc.).

c - Raise the Profile of the Non-Financial co-Benefits of Optimal Energy Efficiency Retrofits: There are significant non-financial yet material co-benefits delivered through the execution of an optimal energy efficiency retrofit including enhanced health and comfort, increased productivity and improved standards of living. These co-benefits may be as strong, or stronger, drivers of a retrofit than the pure economics. In addition, we see a strong correlation between the amount of co-benefits and the relative depth of the retrofit: The deeper the retrofit, the greater the likely positive side-effects to the Building's Occupant and Owner.

Finally, if successful policies and programmes are implemented, the total amount of energy efficiency activity funded in Europe by 2020-25 could reach close to Euro 1 trillion[23]. If levered 1:10, this implies Euro 100 billion of public funding together with Euro 900 billion of private sector co-funding, an amount approximately equivalent to 15% of the total EU27 residential mortgage market[24] in 2008, and of similar magnitude to the expected energy infrastructure investments required of European Utilities[25] over the same period (an already historically high investment budget). From a structuring perspective, we believe that, independently of originating channel (Bank, ESCO, Energy supplier), the broad primary source of capital (debt capital markets) required for such significant sums are those which can guarantee the most permanent access to such low cost funding. This points again to the use of Government "policy bank" balance sheets (eg. KfW) and the need for the development of a robust securitization funding route for energy efficiency retrofit asset portfolios allowing banks, and other energy efficiency retrofit originators, to source the relevant amounts of funding at required low costs.

4

Conclusion

For countries to deliver activity levels of energy efficiency refurbishment in existing buildings consistent with Europe's strategic, economic and environmental goals for 2020, the amounts of investment flows required are in the order of 0.5-0.8% of GDP, some Euro 100 billion in aggregate across Europe and more than double today's investment rates.

This significant financing gap can only be filled with adequate and coordinated policy frameworks with subsidy programs designed to align stakeholder interests, facilitate execution and, most importantly, engage key private sector actors in the wide scale funding, distribution and sale of energy efficiency retrofit solutions to their customers.

In the context of over 100 different energy efficiency financing programmes across Europe, we believe that the time for new experiments in energy efficiency policy is rapidly passing and the window of opportunity to build upon existing experience, best practice, standards, technical know-how, benchmarked procedures and documentation is upon us. Specifically we highlight two areas of best practice development which we see as strong guidelines for public energy efficiency financing mechanisms for building renovation:

Firstly, there is much to learn from the German and UK experiences: In Europe there are few examples of programs which have delivered the scale and public sector financial leverage of Germany's KfW, having stimulated a total investment flow of Euro 54 billion from 2006-2009 from a core public subsidy of Euro 6 billion. The UK's Green Deal also looks to stimulate broad scale energy efficiency refurbishment with target investment rates of 0.5-0.7% of UK GDP in up to 14 million UK homes using a variety of deployment channels in combination with a white certificate program and an energy supplier regulatory mandate. Achieved wholesale leverage for direct public finance solutions appears to lie between 1:4 to 1:9.

Secondly, there are specific EU-level funding sources (like the EIB's ELENA program) which can play an instrumental role in building the capacity and financing the employment of "best practice" and standardized approaches to accelerate the processing and execution of energy efficiency rehabilitation of Europe's public buildings. Anticipated leverage of ELENA capacity building and technical support grants is targeted at 1:25.

Finally, we identify four keys to the greater involvement of private sector actors and additional private sector co-financing: Improved Financing and Simplified Procedures for the Buildings Occupant, Explicit Valuation of the GHG Emissions Reductions resulting from Retrofits, Driving the Engagement of Private Sector Distribution Channels (Banks, Energy Suppliers and ESCOs) and an Increased Focus on the value of the Other Material Co-Benefits to Refurbishment. Within each of these four areas we highlight selected policies which can complement new public funding programmes, modelled upon today's "best in class", and create a "waterfall effect" to unlock private financing sources and deliver the economic, employment, environmental and strategic benefits of this Euro 100 billion European marketplace.

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List of Acronyms

	ACRONYM	MEANING	PAGE NUMBER
1	GDP	Gross Domestic Product	4, 7, 8, 9, 16
2	ESCOs	Energy Service Company	4, 11, 13, 15, 16, 19
3	EU	European Union	4, 6, 15, 16
4	EIB	European Investment Bank	4, 10, 15, 16,
5	ELENA	European Local Energy Assistance	4, 10, 15, 16
6	EU27	European Union 27 Member States	7, 15
7	NPV	Net Present Value	7, 19
8	UNEP	United Nations Environment Programme	7, 18
9	WBCSD	World Business Council for Sustainable Development	7
10	IEA	International Energy Agency	7, 19
11	LCTs	Low Carbon Technologies	7
12	COM	EU Commission	8
13	KFW	Kreditanstalt für Wiederaufbau	5, 8, 9, 10, 14, 15, 16
14	THP	one of Germany's leading real estate consultants	9
15	ECO	Energy Company Obligation	9
16	GIB	Green Investment Bank	9, 10
17	CERT	UK's Carbon Emission Reduction Target (White certificate programme)	10
18	CRC	Carbon Reduction Commitment	10, 11, 13
19	JESSICA	Joint European Support for Sustainable Investment in City Areas	10, 15
20	PACE	Property Assessed Clean Energy	13
21	GHG	Green House Gas	7, 13, 16
22	JASPERS	Joint Assistance to Support Projects in European Regions	15

List of Footnotes

[1] Developed in full in Section 1 of this white paper

[2] European Commission ManagEnergy Website May 2011

[3] EEP Impact Assessment published Brussels, 8.3.2011 SEC(2011) 277

[4] Energy Savings 2020 published in September 2010 by European Climate Foundation as a part of its Roadmap 2050 series

[5] EuroACE position paper on the EU Energy Efficiency Plan 2011, Brussels March 2011

[6] "The Economics of Energy Efficiency in Buildings" by Trevor Houser published by Peterson Institute, Aug 2009

[7] Energy Technology Perspective (IEA 2008 a and b)

[8] Barclays "Carbon Capital: Financing the low Carbon Economy" 2011

[9] Eurostat

[10] NPV calculations based upon Climate Strategy estimates using new IEA oil price forecasts (2011) as applied to European Commission *"Energy Savings 2020"* with oil prices

[14] "Making Money Work for Buildings" EuroACE, September 2010

[15] Renovation Contractor includes Construction Companies, Retrofitters and ESCOs (whose contract terms are linked to subsequent energy performance)

[16] German Ministry of Transport, Building and Urban Development presentation December 2009

* "Cutting Carbon Costs: Learning from Germany's Energy Saving Program" by Anne Power and Monika Zulauf, March 2011

[17] "Energetic Refurbishment in German Building Stocks" Dr. Thomas Herr, November 2009

[18] E3G "Financing the Green Deal" by Ingrid Holmes May 2011

** "Unlocking Investment to deliver Britain's low carbon future" Green Investment Bank Commission 2010 and UK's DECC

[19] UK Parliament Briefing "Green Investment Bank" SNSC-5977 of 23rd May 2011

[20] EIB Annual report 2010

[21] As detailed in depth in "Financing Energy Efficiency Building Retrofits" Climate Strategy & Partners, October 2010

[22] "0" = negligible economic incentives; "1" = weak economic incentives and "2" = strong economic incentives

[23] Euro 100 billion per annum 2012-2020 plus all prior investments

[24] Hypostat 2008: A review of Europe's Mortgage and Housing Markets, European Mortgage Federation, Nov 2009

[25] Citigroup Pan European Utilities Research, October 2009

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