

Energy Efficiency – the first fuel  
for the EU Economy

How to drive new finance for energy  
efficiency investments



**Energy Efficiency**  
Financial Institutions Group

**FINAL REPORT**

covering Buildings, Industry and SMEs

February 2015

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The Energy Efficiency Financial Institutions Group (“EEFIG”) was established as a specialist expert working group by the European Commission and United Nations Environment Programme Finance Initiative (“UNEP FI”), in late 2013, as a result of the dialogue between Directorate-General for Energy (“DG Energy”) and UNEP FI, as both institutions were engaging with financial institutions to determine how to overcome the well documented challenges inherent to obtaining long-term financing for energy efficiency. EEFIG resulted from the joining of these forces to engage with the sector’s stakeholders and financial institutions to create an open dialogue and work platform with the European Commission; and with UNEP FI helping to convene meetings and bring in a variety of active and interested players, among its members and beyond, as per its mission statement of “changing finance, financing change”. Founders believe that the creation of EEFIG represents the first time such a dialogue and work platform has been established between the Commission and the financial sector on the topic of energy efficiency finance.

EEFIG’s work is the consensus effort of over 120 active participants whose current professional experience is representative of one of the following stakeholder groups:

- Public and private financial institutions (banks, investors, insurers etc.);
- Industry representatives and industry associations;
- Banking associations and investor groups;
- Energy efficiency industry experts;
- Energy efficiency services representatives;
- SME associations and expert representatives;
- Civil society experts representing diverse energy efficiency stakeholder groups;
- International Energy Agency (IEA);
- European Commission; and
- UNEP FI.

EEFIG is supported by Climate Strategy and Partners ([www.climatestrategy.com](http://www.climatestrategy.com)) which was contracted to support the coordination and drafting of this report on behalf of EEFIG and whose Chief Executive is the group moderator, rapporteur and an active participant in the group. EEFIG meetings are convened and chaired by DG Energy.

# Energy Efficiency Financial Institution Group's Mandate

The Energy Efficiency Financial Institution Group (“EEFIG”) was established to determine how to overcome the well documented challenges to obtaining long-term financing for energy efficiency<sup>1</sup>. In order to ensure EEFIG's representativeness, practical knowledge base and deep engagement with the finance sector, around 40% of EEFIG participants either work for, or represent the views of, financial institutions. The remaining participants have either worked for finance institutions or were selected for their prior experience and track record of engagement in matters pertaining to the financing of energy efficiency and/or as representatives of buildings, industries or SMEs, and the specialist firms which support them.

This report is the final delivery of EEFIG summarizing its work and thinking over the 16 months between October 2013 and February 2015. During this time EEFIG has met nearly every month and addressed energy efficiency investments, their drivers and trends, for buildings, industry and SMEs in the European Union (EU).

The group was tasked to consider the following questions to increase the flow of energy efficiency investments from a financial institution's perspective:

## **1. What are the most imminent challenges that must be overcome?**

*Given the large amounts written on this subject, this question was designed to bring focus to EEFIG's discussions without ignoring the complexity of the topic. The group addressed this question by identifying and discussing the main drivers that would enable the development of a vibrant market for energy efficiency investments in two target sectors: buildings and industry (which covers large energy intensive and non-energy intensive companies and SMEs).*

## **2. Who would be the right party to address them?**

*Having identified multiple challenges to be overcome, and the drivers for developing such a market, these were prioritized and the relevant, or most suitable, actors identified to address them. While EEFIG would wish that there were a single party to address each challenge, its recommendations are characterized by the adoption of appropriate methods or approaches by many parties to “develop confidence and support the emergence of a market” and “establish synergies between stakeholders” often working from different directions at the same time.*

## **3. What should the European Commission/ EU do?**

*Having prioritized the drivers and assessed a set of approaches and instruments applicable to the different stakeholders, EEFIG is keen to provide a set of practical recommendations to policy makers to increase the flow of energy efficiency investments in Europe.*

The structure of this report reflects the structure and organization of EEFIG process and is written in the name of EEFIG as the consensus and collective opinion of the members and participants in the group.

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<sup>1</sup> ING. (2013). *Energy efficiency is widely regarded as “low-hanging-fruit” but many financial barriers exist that prevent money from flowing into the industry* [Slide]. Retrieved from: [http://www.ing.nl/Images/EBZ\\_ING-Saving\\_Energy\\_in\\_the\\_Netherlands-May\\_2013\\_tcm7-134961.pdf?id=20130825072514](http://www.ing.nl/Images/EBZ_ING-Saving_Energy_in_the_Netherlands-May_2013_tcm7-134961.pdf?id=20130825072514)

# Energy Efficiency Financial Institution Group Members

EEFIG participants have been drawn from the following firms, entities and organizations:

ABB	Energy Efficiency in Industrial Processes (EEIP)	NRW Bank
Agentschap NL	EFIEES	Orgalime
Allianz Global Investors Europe GmbH	Efinovia Europe	Parhelion
Allianz Climate Solutions	EIIF	Polish Bank Association
Allianz Real Estate	Emerson Electric Co.	Polish National Fund for Environmental Protection and Water Management
ASN Bank	European Association of Energy Service Companies (eu.esco)	RICS
Aurubis Belgium N.V./S.A.	European Builders Confederation (EBC)	Schneider Electric
Aviva Investors	EuroACE	Siemens
Bank Nederlandse Gemeenten (BNG)	Eurobank Ergasias SA	Siemens Financial Services GmbH
Bank of Valetta p.l.c.	Eurochambres	Societe Generale
Bpifrance	European Association of Public Banks (EAPB)	SPIRE
Belesco asbl	European Bank for Reconstruction and Development (EBRD)	Spire2030
Belfius	European Climate Foundation	Susi Partners
Bloomberg New Energy Finance	European Investment Bank (EIB)	Sustainable Development Capital Limited
BNG Bank	European Property Federation	Tera srl
BNP Paribas Asset Management	FIEC (European Construction Industry Federation)	The CO-Firm GmbH
BNP Paribas Investment Partners	Green Investment Bank	The Energy Managers Association
Buildings Performance Institute Europe (BPIE)	HBOR – Croatian Bank for Reconstruction and Development	Turboden
Caisse des Dépôts et Consignations	Hermes Investment Management	UNEP Finance Initiative (UNEP FI)
Cassa Depositi e Prestiti	Honeywell	Unicredit
CDC Climat	Huber Dixon	UNIDO - United Nations Industrial Development Organization
CECIMO	Hungarian Development Bank (MFB)	International Union of Property Owners (UIPI)
Cembureau	IFIEC (International Federation of Industrial Energy Consumers)	Union Européenne de l'Artisanat et des Petites et Moyennes Entreprises – UEAPME
Citi Handlowy	ING Commercial Banking	World Business Council for Sustainable Development
Bank Handlowy w Warszawie S.A.	International Energy Agency	
Climate Strategy & Partners	Institutional Investors Group on Climate Change (IIGCC)	
Cogen Europe	Investor Confidence Project	
Credit Suisse Securities (Europe) Limited	IPEEC	
Deneff	KfW Bankengruppe	
Deutsche Bank	Linköping University	
DNV GL	Munich Re	
E3G	Network of European Financial Institutions for SMEs (NEFI)	
EASME		
European Commission (EC)		
Econoler		
EDF FENICE		
EEP – Institute for Energy Efficiency in Production, University of Stuttgart		

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### Legal Disclaimer

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# Executive Summary

## *Energy Efficiency Investment is Strategically Important for the European Union*

**Energy efficiency investment is the most cost effective manner to reduce the EU's reliance, and expenditure, on energy imports costing over €400 billion a year.** While energy efficiency investments have been gradually taking place for decades, the EU today finds itself in a place where these investments have become strategically important due to the high level of energy imports required by the EU bloc, energy price instability and the need to transition to a competitive low carbon and resilient economy. Energy efficiency investing has a fundamental and beneficial role to play in the transition towards a more competitive, secure and sustainable energy system with an internal energy market at its core.

**The Energy Efficiency Financial Institutions Group (“EEFIG”) identifies the need to engage multiple stakeholder groups, scale-up the use of several financial instruments within a clear and enforced “carrot and stick” legislative framework.** This report identifies a number of approaches and instruments that have proven to encourage investments and multiple market barriers that stand in the way of an energy efficient Europe. The scaling up of these successful approaches and removal of these barriers will require a range of identified actions from policy makers and market stakeholders to mobilize the millions of different actors in the EU that will build, finance and benefit from this market. This needs to be driven by an active structural reform agenda that can deliver economies of scale to drive down costs and improve supply capacity and ensure new opportunities for business and investment growth exist across all Member States.

## *A Historic level of Public-private Collaboration is Required*

**The European Fund for Strategic Investments (EFSI) can put energy efficiency first.** In Europe investment levels are around 15% below their 2007 peak. Europe's new Investment Plan aims to address this<sup>2</sup>. EEFIG findings support the Plan's position that there is no single or simple answer to how to boost growth and that addressing both the demand and supply sides of the economy is required. Member States have a clear role to play in pursuing the necessary structural reforms, exercising fiscal responsibility and providing regulatory certainty to boost investment in support of jobs and growth. In this context, **energy efficiency is the first fuel** because it is competitive, cost effective to produce and widely available. For these reasons, EEFIG considers that the Investment Plan should include a clear focus on improving the energy productivity of Europe as a key driver of growth with funds earmarked for energy efficiency investments. In doing so, Europe can unlock the multiple benefits of energy efficiency investments including energy security, competitiveness, social and territorial cohesion, job creation, well-being and greenhouse gas emissions reductions.

**A historic level of public-private collaboration is required to deliver multiples of existing energy efficiency investment flows by 2030.** EEFIG identifies various financial instruments that need to be scaled up and makes a strong case for using public funds to blend with private sector investment to address the risks and achieve the scale of financing needed. This report connects the financial instruments with enabling policies in specific sub-sectors in buildings and industry. Presently, there are insufficient public and private investments in energy efficiency in buildings, industry and in SMEs. If this trend continues then EU Member States are at risk of missing their 2020 and longer-term energy efficiency targets and their economies will be deprived from the boost energy efficiency investment can provide. EEFIG estimates that a five-fold increase in private energy efficiency investments in European buildings is required by 2030. The scale-up of smart financial instruments is required and that they are tailored, by sub-sector, to encourage a long-term and cost effective reduction of energy use in Europe's buildings, industry and SMEs.

## *Oil and Gas Price volatility offers an Opportunity to Build Resilience*

**The dramatic fall in the oil price, and its likely impact in lower European gas prices, well highlights the need for Europe to have buildings, industry and SMEs whose competitiveness and running costs are better insulated from the uncertainties and volatility created by commodity price shocks.** This welcome respite will lower Europe's external fuel bill and provide much needed public and private investment capacity to increase the resilience of EU buildings, industry and SMEs to higher prices, and volatility, through long-term energy efficiency investments. Current carbon prices (€7/ton CO<sub>2</sub>e in the EU Emissions Trading System) are having little direct impact on energy efficiency investment levels in industry

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<sup>2</sup> COM(2014) 903 final

or buildings. However, EEFIG sees lower oil and gas prices as providing a welcome window for policy makers to enforce existing regulations, use fiscal tools to incentivise energy efficiency and reduce distorting “volume purchase” subsidies (where relevant) to large energy consumers and recycle those funds into greater support for energy efficiency, resilience and long-term competitiveness investments.

### ***EEFIG’s Uniquely Engaged Process Delivered Clear and Consensus Results***

**In late 2013, EEFIG (containing over 120 active expert participants) was jointly convened by the European Commission and the United Nations Environment Programme Finance Initiative (“UNEP FI”) to bring together their expertise to address the need to increase the scale of energy efficiency investments across the EU.** This final report represents the consensus and shared views of its expert members from over sixteen months of collaborative work in a process containing several steps: a literature review; characterization of the market and rationale for energy efficiency investments in buildings, industry and SMEs; identification and definition of the key drivers of supply and demand for energy efficiency investments for each sector and prioritization of these by buildings or corporate segment; identification of the instruments and approaches required to stimulate energy efficiency investments each segment and concluding with a set of clear recommendations both to policy-makers and market participants.

#### **The results of this process can be summarised as follows:**

- EEFIG identifies a very strong economic, social and competitive rationale for the up-scaling of energy efficiency investments in buildings and industry in the EU;
- EEFIG sees a strong economic opportunity that is deliverable by boosting both the drivers of demand for and supply of energy efficiency investments in buildings and industry sub-segments;
- Whilst there is no single solution, EEFIG identifies a framework of cross-cutting measures as well as individual requirements to support investments for each market segment, while noting national differences especially in low income countries;
- In its analysis of the different tools and approaches, EEFIG identifies those which can be led by market stakeholders and those which must be policy-led. Both require work in parallel to deliver the targeted increase in energy efficiency investments;
- For buildings and industry EEFIG develops separate analysis and recommendations to policy makers and market participants to increase energy efficiency investment rates and flows;
- EEFIG concludes by highlighting seven key themes which emerge from both buildings and industry and SME analysis and provide the European Commission with final recommendations for its consideration.

### ***EEFIG’s Presents its Key Market and Policy Recommendations***

**EEFIG considers that its recommendations for market and policy-led actions should be considered in the context of broader structural reforms needed to improve the competitiveness of the EU economy and ensure the Investment Plan for Europe has a sustained impact on the EU 2030 climate and energy strategy.** These actions include but are not limited to the following:

#### **Market actions:**

- Improvement of buildings certification methodologies and Energy Performance Certificate standards and the implementation of minimum performance standards upon building upgrade, sale or rental to help build a vibrant and comparable pan-European market for buildings energy efficiency investments;
- Improvement of information flows by developing an open-source energy and cost database for buildings and effective systems for sharing information and technical experience within industry sectors;
- Facilitate innovation such as on-bill repayment and on-tax finance mechanisms by creating pilots to help grow energy efficiency investments in commercial and residential buildings;
- Develop a project rating system to provide a transparent assessment of the technical and financial risks of buildings energy renovation projects and their contracting structure.



### **Economic actions:**

- Streamlining, blending and optimizing the use of European Structural and Investment Funds, Horizon 2020 and EU ETS revenues for energy efficiency investments through ensuring their better linkage to National Building Renovation Strategies together with National Energy Efficiency Funds and energy market reforms;
- Increase the use of targeted fiscal instruments to motivate both building owners and companies to prioritize energy efficiency during their natural replacement cycle;
- Review of public and private accounting treatment of Energy Performance Contracts;
- Further expert examination of the discount rates used in energy modelling, policy-making and investment decision-making, to adequately balance the benefits and risks of energy efficiency.

### **Financial actions:**

- Development of a common set of procedures and standards for energy efficiency and buildings renovation underwriting for both debt and equity investments;
- Adjustment to financial regulatory frameworks to better support capital market innovation, ensure that risk assessment and related capital requirements for long-term energy efficiency investments correctly reflect their risks and develop market potential for green bonds, citizen financing, factoring funds for Energy Performance Contracts and other more innovative sources of financing for energy efficiency;
- Address barriers to expanding the green mortgage market, including by examining how to include energy costs and energy efficiency potential in mortgage affordability calculations;
- Ensure that new regulatory frameworks for financial institutions (Solvency II and Basel III) do not prejudice energy efficiency investments<sup>3</sup>;
- Ensure that public technical assistance and project development assistance facilities are compatible and can be easily combined with market-based and concessional funding by qualified and experienced financial institutions;
- Ensure that public refinancing facilities, like those operated by the European Central Bank, confirm eligibility for financial instruments relating to energy efficiency.

### **Institutional actions:**

- Increase the capacity to facilitate ongoing project development assistance to all relevant actors and technical assistance to relevant public sector bodies and entities for development and aggregation of energy efficiency investments in SMEs and households;
- Review of the public authority procurement rules to better value lower operational costs as a part of their tender assessment processes;
- Institutional capacity to implement National Buildings Renovation Roadmaps that enable long-term planning and supply chain scale-up to deliver and finance ambitious buildings renovation programmes;
- Increased focus on regulatory frameworks which support strong corporate energy efficiency investment choices at key points in their investment cycle (connecting with energy audits);
- Review to ensure that current State Aid rules do not unnecessarily burden accelerated energy efficiency investing and the up-scaling of public-private financial instruments.

The report develops and summarises the above actions and recommendations for policy makers and markets participants by sector in the following tables.

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<sup>3</sup> Including the implementation of the Non-Financial Reporting Directive to improve availability of data for investors which includes energy use and efficiency and pass and implement the Shareholder Rights Directive to improve investor engagement with listed companies on sustainability and energy issues.

## Summary of EFIG Recommendations (Buildings Sector)

<i>To Policy Makers</i>	<i>To Markets Participants</i>
Existing Buildings Regulations should be fully implemented, harmonised and consistently enforced across EU Member States	Engage key decision makers (owners and managers) with a clear business case that raises their awareness of the multiple benefits of buildings' energy efficiency renovations with evidence
Future Regulatory Pathways for EU Buildings should provide concerted and consistent regulatory pressure to improve the energy efficiency of buildings	Make it easy to get the right data to the right decision makers
High quality decisions and low transaction costs can only be delivered by easily accessible data and standard procedures	Improve the Processes and Standards for Buildings Labels, Energy Performance Certificates and Energy Codes
Reporting, accounting and procurement procedures must facilitate, and not hinder, appropriate energy efficiency investments in public buildings	Standards should be developed for each element in the energy efficiency investment process
The "at-scale" energy efficiency upgrade of residential buildings can only happen with a concerted address of the specific investment demand and supply drivers of this segment and the engagement and alignment of retail distribution channels	Leverage of private sector finance through optimal use of European Structural and Investment Funds and Member States funds
The targeted address of energy efficiency investment supply and technical assistance through the smart deployment of European Structural and Investment Funds 2014-2020 and Horizon 2020 into risk sharing mechanisms and project development assistance, working with partners with an successful track-record	

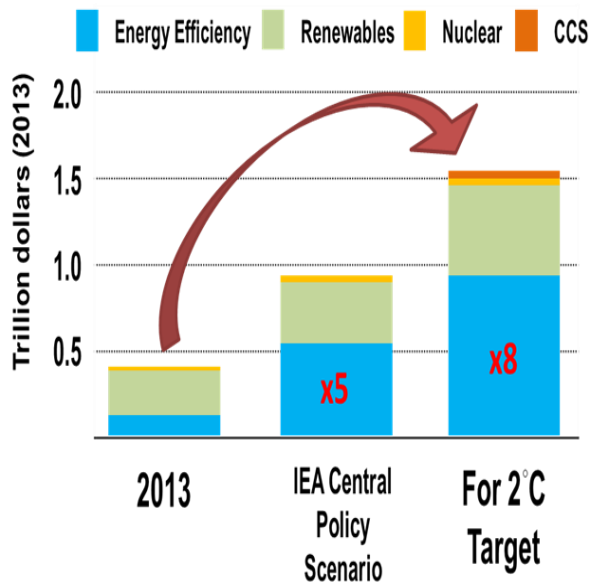
## Summary of EFIG Recommendations (Industry & SMEs)

<i>To Policy Makers</i>	<i>To Markets Participants</i>
Policy framework should positively support strong corporate energy efficiency investment choices at key points in their investment cycle, using a "carrot and stick" approach	Raise energy efficiency opportunities at board-level and implement appropriate strategic resource investments to capture their multiple benefits within the natural company investment cycle
Public resources and facilitation should be engaged to establish dynamic and effective systems for sharing information and technical experience	Financial institutions should more widely adopt existing "best practice" models to stimulate their clients' energy efficiency investments
Ensure EU and national policies and resources are working effectively together to drive R&D and optimal energy efficiency outcomes	Encourage and support collaborative processes and consider R&D whose objective is to reduce the cost of and improve the up-take of energy efficiency investments
Support the clarification of the regulatory, fiscal and accounting treatment and standardisation of Energy Performance Contracts	Standards should be developed for the legal terms in and process to negotiate energy performance contracts
Energy efficiency opportunity identification and investible project pipelines should be supported with Project Development Assistance facilities for SMEs	

# 1. Rationale for Scaling up Energy Efficiency Investments in Europe

*"The multiplying of energy efficiency investments in Europe makes good economic sense, will increase competitiveness and employment and is core to the cost-effective delivery of decarbonisation targets."* – Maroš Šefčovič, Vice President, European Commission.

Energy Efficiency has been described as the EU's biggest energy resource<sup>4</sup> and one of the most cost effective ways to enhance the security of its energy supply and decrease the emissions of greenhouse gases and other pollutants. This is why the EU has primary energy consumption saving targets for 2020, 2030 and further legislation in the field looking to a 2050 horizon.



**Figure 1: IEA Illustration of Increased Energy Efficiency Investments needed under its 450 Scenario**

In 2012, global energy efficiency investments across all sectors totalled \$310 billion<sup>5</sup> representing a very significant and growing market opportunity for investors and businesses. The IEA, in its 450 Scenario<sup>6</sup>, sees the EU as needing to invest a further \$1.3 trillion in energy efficiency in buildings from 2014-2035 and \$154 billion in energy efficiency in industry – almost doubling current investment trends. This analysis coincides with Ceres' 2014 global work<sup>7</sup> projecting a global increased annual investment need (2010-2020) of \$300 billion in buildings' energy systems and \$30 billion in industry, to limit global temperature rises to a 2°C scenario. The value added of these energy efficiency investments in buildings and industry is, of course, in energy saved<sup>8</sup> and the impact on buildings' and industries' financial performance<sup>9</sup> and competitiveness<sup>10</sup>.

<sup>4</sup> COM (2011) 0109 final

<sup>5</sup> IEA. (2014). *Energy Efficiency Market Report 2014*. [Executive Summary]. Retrieved from: <http://www.iea.org/Textbase/npsum/EEMR2014SUM.pdf>

<sup>6</sup> IEA. (2014). *Special Report: World Energy Investment Outlook*. Retrieved from: <http://www.iea.org/publications/freepublications/publication/WEIO2014.pdf>

<sup>7</sup> "Industrial investment" just projected for 5 top industrial segments and covers "clean energy" = energy efficiency and CCS. Please see below:

CERES. (2014). *Investing in the Clean Trillion: Closing the Clean Energy Investment Gap*. Retrieved from: <http://www.ceres.org/resources/reports/investing-in-the-clean-trillion-closing-the-clean-energy-investment-gap/view>

<sup>8</sup> BoAML study shows that for every dollar spent on energy efficiency appliances, buildings, equipment and expenditures avoids more than US\$2 of investment in electricity supply, and saves up to US\$4 in lifetime energy expenditures.

BoAML. (2012). *SRI & Sustainability: Less is more, Global energy efficiency*. Retrieved from: <http://about.bankofamerica.com/assets/pdf/SRI-and-Sustainability-030112.pdf>

<sup>9</sup> UNEP FI (2014). *Unlocking the energy efficiency retrofit opportunity*. Retrieved from: [http://www.unepfi.org/fileadmin/publications/investment/Commercial\\_Real\\_Estate.pdf](http://www.unepfi.org/fileadmin/publications/investment/Commercial_Real_Estate.pdf)

<sup>10</sup> Australian Government Department of Industry, ClimateWorks Australia & IIGC. (2014). *Energy Management and Company Competitiveness*. Retrieved from: [http://www.igcc.org.au/Resources/Documents/climateworks\\_emcc\\_20141013.pdf](http://www.igcc.org.au/Resources/Documents/climateworks_emcc_20141013.pdf)



Energy efficiency investments are characterised by their capacity to bring direct energy returns<sup>11</sup>, and additional value streams to private owners and asset operators<sup>12,13</sup>, as well as significant public benefits in terms of increased employment, lower emissions, increased energy security and reduced dependence on foreign energy imports and improvements to a country's fiscal balance<sup>14</sup>. Europe's Energy Efficiency Plan<sup>15</sup> expects to deliver 2 million jobs, increased industrial competitiveness together with potential annual financial savings estimated at Euro 1,000 per European household and aggregate annual emissions reductions of 740 million tons of CO<sub>2</sub>e. Enabling more energy efficiency investments also represents a way for financial institutions to bring forward tailor-made and new product offering to the market and contribute to their own competitiveness as well as giving their clients the financial support they need to assist them in the transition to a low-carbon economy.

Yet, notwithstanding the “win-win” characteristics of energy efficiency investments, present investment flows in energy efficiency are sub-optimal. Prominent studies<sup>16</sup> assessing greenhouse gas mitigation potential identify the building sector as having the largest untapped long-term, cost-effective energy saving potential. Estimates suggest that € 60-100 billion<sup>17</sup> is needed to be invested annually in EU buildings to achieve Europe's 2020 energy efficiency targets yet current investments are below half of these requirements<sup>18</sup> and five times lower than required to deliver 2050 decarbonisation targets for buildings<sup>19</sup>. In addition, while European industry is world leading in energy efficiency<sup>20</sup>, continued and increasing energy efficiency investment flows will enhance its global competitiveness, protect against energy price volatility and deliver further cost savings in all segments.

In 2012, the Energy Efficiency Directive (2012/27/EU) was adopted to help fill the policy gap without which it was expected that the EU would have missed its 2020 energy efficiency targets by some 11%<sup>21</sup>. In 2014, most of the Energy Efficiency Directive was due to be transposed into National Law in Member States and the framework for the deployment of European Structural and

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<sup>11</sup> Ibid

<sup>12</sup> IEA. (2014). *Capturing the Multiple Benefits of Energy Efficiency*.

<sup>13</sup> IIGCC (2013). *Protecting value in real estate - Managing investment risks from climate change*. Retrieved from: [www.iigcc.org/publications/publication/protecting-value-in-real-estate-managing-investment-risks-from-climate-change](http://www.iigcc.org/publications/publication/protecting-value-in-real-estate-managing-investment-risks-from-climate-change)

<sup>14</sup> Fraunhofer Magazine. (2014). *European Diversity*. Retrieved from: [http://www.fraunhofer.de/en/publications/fraunhofer-magazine/magazine\\_2014/Fraunhofer-magazine\\_1-2014/magazine\\_1-2014\\_32.html](http://www.fraunhofer.de/en/publications/fraunhofer-magazine/magazine_2014/Fraunhofer-magazine_1-2014/magazine_1-2014_32.html)

<sup>15</sup> European Commission. (2014). *Energy Efficiency Plan* [Website]. Retrieved from: [http://ec.europa.eu/energy/efficiency/action\\_plan/action\\_plan\\_en.htm](http://ec.europa.eu/energy/efficiency/action_plan/action_plan_en.htm)

<sup>16</sup> Such as UNEP (2013). *The Emissions Gap Report 2013: A UNEP Synthesis Report*. Retrieved from: [http://www.unep.org/pdf/UNEP\\_EmissionsGapReport2013.pdf](http://www.unep.org/pdf/UNEP_EmissionsGapReport2013.pdf)

<sup>17</sup> COM (2012) Consultation Paper: “Financial Support for Energy Efficiency in Buildings”; and EURIMA. (2012). *Financing Mechanisms for Europe's Buildings Renovation*. Retrieved from: <http://www.climatestrategy.es/index.php?id=27>

<sup>18</sup> DIW. (2013). *Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward*. Retrieved from: [http://hayek.diw.de/documents/publikationen/73/diw\\_01.c.422405.de/hudson\\_financing.pdf](http://hayek.diw.de/documents/publikationen/73/diw_01.c.422405.de/hudson_financing.pdf)

<sup>19</sup> BPIE Estimates based upon 2011's "Europe's Buildings under the Microscope: A Country-by-country review of the energy performance of Europe's buildings". Retrieved from: [http://www.bpie.eu/eu\\_buildings\\_under\\_microscope.html](http://www.bpie.eu/eu_buildings_under_microscope.html)

<sup>20</sup> Evidenced by Energy Intensity and Energy Productivity measures for OECD Europe sourced from:

IEA.0 (2014). *Energy Efficiency Market Report 2014 – Market Trends and Medium-Term Prospects*.

European industry improved its energy intensity by almost 19% between 2001 and 2011, compared with only 9% in the US:

COM (2014) 21 /2

SWD(2014) 20 - Report on energy prices and costs. Retrieved from: [http://ec.europa.eu/clima/policies/2030/documentation\\_en.htm](http://ec.europa.eu/clima/policies/2030/documentation_en.htm)

European Commission. (2014). *Energy Economic Developments in Europe: European Economy 1/2014*. Retrieved from: [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2014/pdf/ee1\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2014/pdf/ee1_en.pdf)

<sup>21</sup> COM (2012) Consultation Paper: “Financial Support for Energy Efficiency in Buildings” and 2013 Analysis by the Coalition for Energy Savings’ of indicative national energy efficiency targets, which member states were to report to the Commission by April 2013, showed the EU is expected to miss its 20% target of 1483 million tonnes of oil equivalent (Mtoe) for 2020 by a 68Mtoe equal to 4.5%.

Investment Funds (“ESIF”) for the up-coming programming period 2014-2020 was agreed. It is commonly assumed that for each euro of public funds invested in energy efficiency significant multiples are, or will be, invested by the private sector.

European PRI signatories manage over € 12 trillion<sup>22</sup> of funds and the amount professionally invested in real estate in Europe is estimated as € 5.6 trillion in mid-2014<sup>23</sup>. Europe’s 2050 decarbonisation target requires cumulative energy efficiency investments of € 4.25 trillion euros<sup>24</sup> above the business as usual pathway from now until 2050 and the key will be to identify instruments and approaches which can connect this investment need with the appropriate finance sources. Increasing the level of confidence between different stakeholders, through the mechanisms identified and described in EFIG’s work, can help unlock the needed public and private finance sources and fill the energy efficiency investment gap.

*“Our research demonstrated that Europe can probably save another 10 to 15% of energy by 2030 with appropriate energy efficiency measures with no negative impact on economic growth. We therefore believe that more efficient energy will have double benefits, to Europe’s environmental and economic growth targets.” – Urs Rohner, Chairman of Credit Suisse Group AG.*

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<sup>22</sup> KPMG. (2013). *European Responsible Investing Fund Survey 2013*. Retrieved from: <http://www.kpmg.com/LU/en/IssuesAndInsights/Articlespublications/Documents/European-Responsible-Investing-Fund-Survey-2013.pdf>

<sup>23</sup> Estimate of the total real estate market \$7.6 trillion in Europe, gathered from:

EPRA. (2014). *Monthly statistical bulletin: Oct 2014*. Retrieved from: [http://www.epra.com/media/Monthly\\_Statistical\\_Bulletin\\_October\\_2014\\_1414927075752.pdf](http://www.epra.com/media/Monthly_Statistical_Bulletin_October_2014_1414927075752.pdf)

<sup>24</sup> E3G. (2012). *The Macroeconomic Benefits of Energy Efficiency – The case for public action*. Retrieved from: [http://www.e3g.org/images/uploads/E3G\\_The\\_macro-economic\\_case\\_for\\_energy\\_efficiency-Apr\\_2012.pdf](http://www.e3g.org/images/uploads/E3G_The_macro-economic_case_for_energy_efficiency-Apr_2012.pdf)



## 2. Energy Efficiency Investments in EU Buildings

"Buildings account for about one-third of the world's energy consumption and global greenhouse gas emissions, and improving energy efficiency in the building sector is a global priority. I am confident that this dialogue between policy-makers and financial institutions will lead to much needed investment of private funds." – Achim Steiner, Under Secretary-General of the United Nations and Executive Director of UNEP.

### 2.1. EU Buildings Market Investment Characterization

Buildings are responsible for the largest share of European final energy consumption (40%<sup>25</sup>) and they represent the greatest potential to save energy - as 75% of buildings standing in the EU were built during periods with no, or minimal, energy-related building codes<sup>26</sup> and the energy intensity of heating per floor area is two times higher than any other region of the world (except Russia). Buildings are long-term assets expected to remain useful for 50 or more years<sup>27</sup> and 75-90% of those standing today are expected to remain in use in 2050<sup>28</sup>. With low demolition rates (0.1% per year), low renovation rates (1.2% per year)<sup>29</sup> and moves to highly energy efficient new-build (1% additions per year), Europe's energy efficiency challenge in buildings mainly concerns the energy efficient renovation and investments in its existing buildings stock.

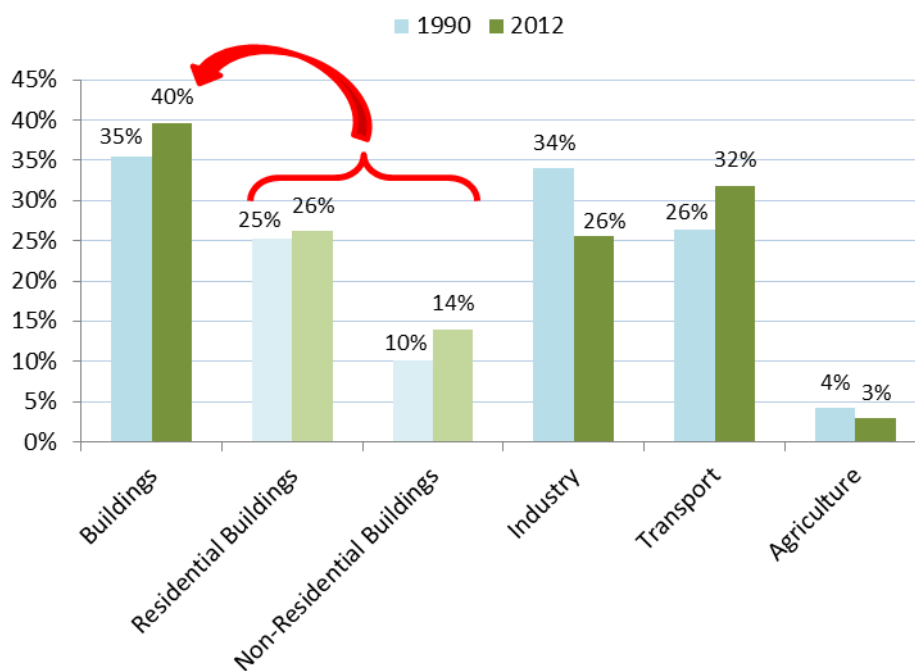


Figure 2: Share of buildings in final energy consumption in EU-28 (Source: Eurostat)

<sup>25</sup> Enerdata. (2012). *Energy Efficiency Trends in Buildings in the EU*. Retrieved from: <http://www.odysseemure.eu/publications/br/Buildings-brochure-2012.pdf>

<sup>26</sup> Ristori, D. (2013). *JRC Conference on "Scientific Support to EU Growth and Jobs: Efficient buildings, vehicles and equipment* [Introductory Remarks]. Retrieved from: [http://ec.europa.eu/dgs/jrc/index.cfm?id=2470&obj\\_id=4330&dt\\_code=EVN](http://ec.europa.eu/dgs/jrc/index.cfm?id=2470&obj_id=4330&dt_code=EVN)

<sup>27</sup> COM (2008) 780 final.

<sup>28</sup> COM (2012) Consultation Paper: "Financial Support for Energy Efficiency in Buildings".

<sup>29</sup> EuroACE. (2014). *Renovate Europe* [Website]. Source: Retrieved from: <http://www.euroace.org/Resources/Projects/RenovateEurope.aspx>



The energy efficient renovation of existing buildings is certainly a complex task to undertake<sup>30</sup>. This is due to the wide range of building types, their age, different uses, materials and energy consumption patterns, but it is no more complex than other equivalent challenges facing EU Member States and it comes with the significant public and private benefits described above. In order to make EEFIG's approach and recommendations to increase investments in the energy efficient renovation of EU buildings more practical, the sector has been segmented into: Commercial Buildings, Publicly Owned Buildings and Private Residential Buildings. It became clear during EEFIG's deliberations that the approaches and recommendations to increase energy efficiency investments in these three segments are materially different.

Finally, increased investments in energy efficient building renovation will not be attained just through "the market" in any segment at the levels required to meet Europe's targets for reducing the GHG emissions from the EU economy by 80% 2050. Market forces will need to be complemented by public funds, a pragmatic, predictable, long-term and supportive regulatory environment and a fundamental behavior change among sector stakeholders. These factors will be needed in order to ensure that the renovation rate and depth increases at least 2.5 times by 2020 – the rate that is required if 2050 goals are to be met<sup>31</sup>.

This report identifies a clear need to increase demand for energy efficiency investments in each of Europe's buildings segments. It also identifies a need to increase the supply of providers to identify, deliver and verify high quality renovations and to provide a supply of finance for them. Much of the existing literature and research on energy efficiency finance deals (often implicitly) with the drivers of the supply of finance for energy efficiency investments, EEFIG considers that addressing the demand for energy efficiency investments in building renovation is a critical precursor to scaling up the supply of finance that often the approaches and instruments often required to drive demand are different from, albeit connected to, those which will unlock energy efficiency investment supply.

## **2.2. Drivers of Demand for and Supply of Energy Efficiency Investments in Buildings**

To interpret EEFIG's prioritization of the drivers of demand and supply for energy efficiency investments in the renovation of buildings in the EU, a clear definition of terms and characterization of the segments addressed is required. The following are the definitions of the building sector segments as understood and agreed by consensus by EEFIG members and resulting from its survey work to order the group's thinking and around which to focus its recommendations for the buildings sector. In addition, the key drivers themselves are defined in Section 5.2.1 of the Appendices.

### **2.2.1. Market Segments**

1. **Commercial Buildings:** Commercial buildings are used primarily for business purposes and include, for example: shopping centers, offices, restaurants, hotels, hospitals, garages and stores. In many cases, varying significantly by Member State, the businesses that occupy the commercial building lease their space and a third party investor owns the building and collects rent from its occupants. A key challenge for energy efficiency investments in commercial buildings is that investment decisions are often based on short-term time horizons<sup>32</sup> and there can be a split incentive between the owner and the occupier – meaning the occupant not the owner usually pays the energy bills, reducing the direct financial

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<sup>30</sup> World Business Council for Sustainable Development. (2009). *Energy Efficiency in Buildings: Transforming the Market*. Retrieved from: <http://www.wbcsd.org/transformingthemarketeeb.aspx>

<sup>31</sup> BPIE. (2011). *Europe's Buildings under the Microscope: A Country-by-country review of the energy performance of Europe's buildings*. Retrieved from: [http://bpie.eu/uploads/lib/document/attachment/20/HR\\_EU\\_B\\_under\\_microscope\\_study.pdf](http://bpie.eu/uploads/lib/document/attachment/20/HR_EU_B_under_microscope_study.pdf)

<sup>32</sup> World Business Council for Sustainable Development. (2009). *Energy Efficiency in Buildings: Transforming the Market*. Retrieved from: <http://www.wbcsd.org/transformingthemarketeeb.aspx>

incentive to undertake renovation works (or energy is included in rent). Notwithstanding this, commercial buildings are often larger, more energy intensive<sup>33</sup>, are often owned in portfolios, managed like financial assets and have their own facilities managers who can be a useful technical resource, when adequately incentivized. Commercial buildings use 13%<sup>34</sup> of the energy consumed in EU buildings.

2. **Public Buildings:** Public buildings are those owned or operated by a governing body (central, regional or local) and often occupied by a government entity or agency. EEFIG also includes in this segment publicly owned residential buildings – such as social housing – and state schools and universities. Publicly owned or occupied buildings represent about 12% by area of the EU building stock<sup>35</sup>. Energy efficiency investments in public buildings are unique in that the public owner can perceive both the energy savings, productivity and value improvements normally accruing to the owner (as for private owners) as well as the public goods of increased employment, reduced emissions and improvements to public accounts. In principle, public buildings share many of the benefits of commercial buildings (size, energy intensity, concentrated ownership, professionalized facilities managers) but face additional challenges of more cumbersome procurement procedures, potential split incentives between different divisions responsible for procurement and for the energy bills, balance sheet restrictions and limitations under public accounting rules. Notwithstanding the above, EEFIG notes that Public Services Buildings and Public Residential Buildings have significantly different investment decision structures and energy needs.
3. **Private Residential Buildings:** Private residential buildings can be sub-segmented into multi-family dwellings, semi-detached and single family homes and they are owned or rented. Residential buildings account for around two thirds of final energy consumption in European buildings<sup>36</sup> and, depending upon Member State, can be owner occupied (resolving owner-tenant split incentives, but not necessarily between current and future owners), can be highly inefficient and often have economically attractive energy efficiency investment returns, yet this market segment is highly fragmented and requires a successful and low cost retail distribution strategy to engage at scale.

### ***2.3. Analysis and Prioritization of the Drivers of Demand for Energy Efficiency Investments in Buildings***

The lack of demand for energy efficiency investments remains perhaps the most critical missing element preventing the greater allocation of resources from financial institutions towards this sector. The EEFIG group discussed and identified 25 drivers affecting demand for energy efficiency investment for building renovation through open debate among its members. Subsequently, 51 EEFIG members answered an online survey requiring the weighting in importance of these 25 drivers for each different segment of the buildings market – a full definition and explanation of EEFIG key drivers and Relevant Driver Survey can be found in the Appendices in Section 5 of this report. The following table 2 provides a summary of the results of this exercise (each driver is ranked 1-25 in terms of its survey score for each building segment; top ranks are coloured with greater intensity blue) and the group’s observations and analysis are discussed below:

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<sup>33</sup> BPIE. (2011). *Europe’s Buildings under the Microscope: A country-by-country review of the energy performance of buildings*. Retrieved from: [www.bpie.eu/eu\\_buildings\\_under\\_microscope.html](http://www.bpie.eu/eu_buildings_under_microscope.html)

<sup>34</sup> Enerdata. (2012). *Energy Efficiency Trends in Buildings in the EU*. Retrieved from: <http://www.odyssee-mure.eu/publications/br/Buildings-brochure-2012.pdf>

<sup>35</sup> Ecofys, Ecorys & Bio Intelligence Service. (2010). *Study to Support the Impact Assessment for the EU Energy Saving Action Plan*.

<sup>36</sup> Enerdata. (2012). *Energy Efficiency Trends in Buildings in the EU*. Retrieved from: <http://www.odyssee-mure.eu/publications/br/Buildings-brochure-2012.pdf>

**Table 2: EEFIG ranking of key drivers affecting demand for energy efficiency investment by market segment.**

Buildings Sector	Commer- cial	Public	Public Rental	Owner Occupied	Private Rental	Average Rank
Standardization	6	3	1	11	2	4.6
Clear Business Case	1	7	9	9	4	6
Effective enforcement of regulation	4	6	6	8	6	6
Awareness at Key Decision Maker Level & Leadership	2	2	2	12	13	6.2
Buildings Regulation, Certification and Energy Performance Certificates	5	4	3	13	11	7.2
Tailored Financial Product availability	18	11	7	5	3	8.8
Transaction costs / simplicity	10	16	12	2	5	9
Regulation which impacts on timing and scope of renovation	7	8	4	15	14	9.6
Regulatory Stability	3	9	10	19	9	10
Facilitation/ Technical Assistance	22	5	8	10	15	12
Fiscal Support	14	25	22	4	1	13.2
Body of Evidence (including Social Benefits and Costs)	13	13	11	16	17	14
(Individual/ Owner) Payment Capacity	23	22	18	1	8	14.4
Awareness of appropriate timing for energy efficiency measures within the traditional building cycle	16	15	13	18	10	14.4
Awareness. Communication & Marketing	20	20	24	6	7	15.4
Measurement, Reporting & Verification (MRV) and Quality Assurance	9	10	15	22	21	15.4
"Green Premium" / Brown Discount	8	23	23	14	12	16
Rules on public authority accounting, procurement and reporting	25	1	5	25	25	16.2
Price of energy	11	19	21	7	24	16.4
Mandatory Energy Audits	15	14	17	21	19	17.2
Availability of Data	12	17	19	20	20	17.6
Definition and common understanding of the value of energy cost savings	17	18	16	17	23	18.2
Human Capacity	19	12	14	24	22	18.2
Behavioral Economics (personal priorities)	24	24	25	3	16	18.4
Communication between market actors	21	21	20	23	18	20.6

Most clearly, EEFIG members determined that the key drivers for demand for energy efficiency investments vary by buildings segment and are dramatically different in the owner occupied residential sector compared to others. EEFIG interprets this as a clear sign that, from a financial institution’s perspective, buildings market segmentation for investments and policy making makes sense; and that there is no “one-size fits all” approach which can be equally successful in driving energy efficiency demand across all segments of buildings in the EU. **However, a strong regulatory framework with effective enforcement of regulation is the only demand driver which EEFIG sees as a truly “cross-cutting” priority across all buildings segments.**

There is a high degree of agreement among EEFIG members that the demand for energy efficiency investments in the Commercial and Public Buildings segments is driven by strong leadership and awareness of the opportunities at the key decision maker level; Buildings regulation, building certification and energy performance certificates and Standardization. Commercial buildings’ key decision makers also require a clear business case as well as assured regulatory stability; whereas EEFIG members see the rules guiding public authority accounting, procurement and reporting and facilitation and technical assistance as having the greatest impact on energy efficiency investment demand for Public buildings.

For private residential buildings, EEFIG members collectively saw energy efficiency investment demand drivers being more related to individual payment capacities, which in turn is linked to consumer priorities and preferences; ease of undertaking investments (simplicity and the impact of financial and non-financial transaction costs); the need for tailored financial products; and the need for fiscal support in certain circumstances. This suggests that success in unlocking energy efficiency investment demand from homeowners will require changing spending priorities through having a simple, tailored, low interest rate (and potentially tax efficient) retail energy efficiency financing offer tailored to different income levels and which is cleverly positioned considering its full range of economic and non-economic benefits in the context of the householders priorities. While not ranked “top-5” it is also clear that EEFIG feels that awareness, communication and marketing is a priority to support the demand for energy efficiency investments in private residential buildings.

Contrary to initial expectations of some EEFIG members, and several research studies<sup>37</sup>, the value enhancement (“Green Premium”/ Brown Discount) seems to be a considerably stronger driver of demand for energy efficiency investments in commercial buildings when compared to residential. Similarly, “availability of data” may seem to rank surprisingly low, however in follow up discussion the group identified that both these terms were understood to be core components of a clear business case (therefore covered in different drivers); and an ingredient to produce a tailored retail lending product for residential renovation. Finally, the energy price was not ranked very highly except in the residential sector.

#### ***2.4. Analysis and Prioritisation of the Drivers of Supply of Energy Efficiency Investments in Buildings***

The EEFIG group discussed and identified 23 drivers affecting the supply of finance for energy efficiency investments in building renovation through open debate among its members in its January 2014 meeting. In an online survey 51 EEFIG members weighted the importance of these 23 drivers for each different segment of the buildings market<sup>38</sup>. The following table 3 provides a summary of the results of this exercise (each driver is ranked 1-23 in terms of its survey score for each building segment; top ranks are coloured with greater intensity blue) and the group’s observations and analysis are discussed overleaf:

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<sup>37</sup> Hyland, M., Lyons, R. C., & Lyons, S. (2013). *The value of domestic building energy efficiency — evidence from Ireland*. *Energy Economics*, 40, 943-952; Brounen, D. & Kok, N. (2009). *On the economics of energy labels in the housing market*. Retrieved from: <http://urbanpolicy.berkeley.edu/greenbuilding/brounenkok.pdf>; and survey conducted by French Notaries, Notaires de France. (2013). *Valeur verte des logements d’après les bases Notariales BIEN et PERVAL* [Website]. Retrieved from: <http://www.notaires.fr/fr/la-valeur-verte-des-logements>

<sup>38</sup> a full explanation of EEFIG’s Relevant Driver Survey can be found in the Appendix

**Table 3:** EFIG ranking of key drivers affecting supply of energy efficiency investment by market segment.

Buildings Sector	Commercial	Public	Public Rental	Owner Occupied	Private Rental	Average Rank
Standardization	3	1	1	1	2	1.6
Regulatory Stability	1	4	2	4	3	2.8
Increased Investor Confidence & Change in Risk Perception	2	5	7	5	4	4.6
Transaction costs / simplicity	7	10	6	2	1	5.2
Measurement, Reporting & Verification (MRV) and Quality Assurance	4	2	4	10	8	5.6
Lender's approach to risk assessment (non-recourse project financing vs. Borrower-based credit recourse)	8	6	5	6	5	6
Risk-return targets	6	11	9	7	7	8
Use of European Structural & Investment Funds	18	3	3	11	9	8.8
Availability of Data	5	9	13	12	10	9.8
Price of energy	14	7	10	8	15	10.8
Aggregation Challenge	19	16	8	9	11	12.6
Buildings Regulation, Certification and Energy Performance Certificates	10	12	14	14	13	12.6
Definition and common understanding of the value of energy cost savings	12	8	15	17	18	14
Financial regulation	13	13	12	16	16	14
On-bill mechanism	22	22	18	3	6	14.2
Finance Supply from EEO in Article 7 of EED	23	18	11	15	12	15.8
Body of Evidence (including Social Benefits and Costs)	11	15	19	13	23	16.2
Capital Markets Environment	15	19	16	21	17	17.6
Sustainable Real Estate Funds	9	20	17	23	21	18
Fiscal Support	20	21	20	18	14	18.6
Communication between market actors	17	14	21	22	20	18.8
"Green Premium" / Brown Discount	16	23	22	19	19	19.8
Awareness. Communication & Marketing	21	17	23	20	22	20.6

Perhaps unsurprisingly for a financial institutions group, EFIG members were in far stronger overall agreement around the priority drivers for the supply of energy efficiency investments than about the demand for them and in this case, while the residential sector still shows some divergence, many of the top ranked supply drivers are common across all buildings segments.

EFIG members see the top drivers of the supply of energy efficiency investments as standardisation and regulatory stability – having a strong and stable regulatory environment. In addition to these “cross-cutting” drivers, and looking at specific answers by market segment; reduced transaction costs and simplicity with on-bill repayment mechanisms appear as strong drivers of energy efficiency investment supply for the residential buildings sector; yet measurement, reporting & verification (MRV) combined with quality assurance feature as key drivers of energy efficiency investment supply for commercial and public buildings; and Increased investor confidence and changes in risk perception are ranked highly just in the commercial buildings sector.

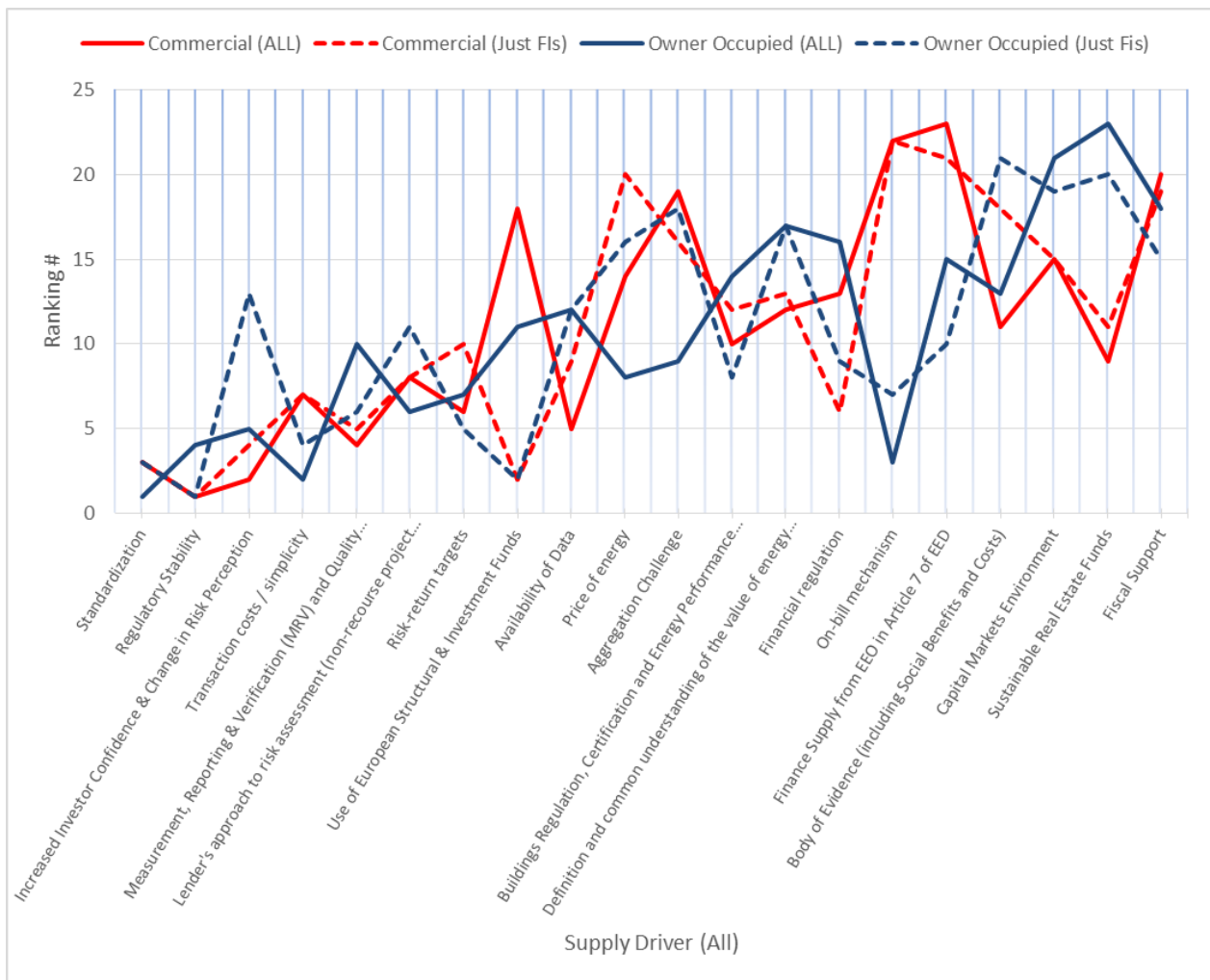
Interestingly, Figure 2 shows how the EFIG buildings survey responses on the supply drivers from EFIG group members working directly for or directly representing financial institutions (those closest to the institutions expected to provide finance, marked in dotted lines) differ from those of the whole group (marked in continuous lines). The most material difference in opinion is the very



high ranking of the “Use of European Structural and Investment Funds” (ESIF) by the financial institution subset of EEFIG members who see this as the third priority driver of finance supply. While there are clear differences in the use of specific vocabulary between the different members of EEFIG, the high priority for use of ESIF to support energy efficiency investments in buildings is an indication of the need for public support to lever private sector capital and share certain risks. The group as a whole captures this idea in the “need for increased investor confidence” and “changes in the risk perceptions” for energy efficiency investments and sees ESIF being more directed to support the renovation of Public Buildings rather than across all buildings segments.

Finally, the recourse vs non-recourse nature of lenders’ risk assessment of energy efficiency investments ranks as a high priority for all members – but just the financial institutions note the importance and impact of financial regulation on investment supply. EEFIG members directly representing financial institutions noted that capital adequacy requirements within financial regulations (Basel III for banks and Solvency II for insurance companies) would need careful attention for their impacts on the capacity and ability of financial institutions to deploy long-term funds, in general, and specifically into real estate.

**Figure 3:** Comparison of survey responses ranking key supply drivers of energy efficiency investments (for Commercial and Owner Occupied Buildings) from EEFIG members representing Financial Institutions (FI) versus whole group (“All”).





## 2.5. EEFIG Combined Insights into the Drivers of Energy Efficiency Investments (Demand & Supply) in Buildings

EEFIG's overall discussions and complemented by its prioritisation exercise for the drivers of demand for and supply of energy efficiency investments for building renovation generated a key set of overall insights which are summarised here:

- **There is no “silver bullet”:** Stimulating greater volumes of energy efficiency investments in buildings cannot be resolved with a single policy or instrument or stakeholder group. Different approaches, instruments and solutions will be required for different segments of the buildings sector and while all of the 23-25 drivers identified by EEFIG members have some role to play in the solution, clearly some will have a more significant impact on investment flows than others. However, managing this level of complexity is not unusual within financial institutions and real estate businesses. EEFIG members believe that a tailored approach can be built over time to handle the level of complexity, detailed information and aggregation required to address each of these drivers.
- **There is a clear “base-line” of cross-cutting drivers:** There are a clearly identifiable set of drivers which must be in-place to create the necessary conditions for energy efficiency investments to flow in greater volume into building renovations across all segments. These include: Standardisation of key aspects of the energy efficiency investment process, that should be “open source” establishing a common vocabulary, shared knowledge and performance data between stakeholders and financial institutions; A strong, stable and effectively enforced regulatory framework, including Building Regulations (including minimum standards of energy performance), Building Certification and Energy performance certificates; and the smart use of EU Structural & Investment Funds to leverage private funds and provide technical assistance.
- **Specific Measures are required for Specific Segments:** In addition to the “base-line” of cross-cutting drivers there are a further set of segment-specific energy efficiency investment drivers that can be summarised by segment:
  - **Commercial Buildings:** The keys to unlock energy efficiency investment flows in the commercial buildings sector are to engage key decision makers and sector leaders with a clear business case to increase their confidence and understanding of the risks, supported by strong measurement, verification and reporting protocols and quality assurance.
  - **Public Buildings:** There needs to be greater awareness of the energy efficiency opportunities and benefits at key decision maker level within the public owners and leadership demonstrated by the ambitious and timely energy efficiency renovation of the buildings they control. This should be facilitated through technical assistance to relevant public sector bodies and a careful review of the public authority procurement and accounting process<sup>39</sup>. The latter ensures that the energy savings and other multiple benefits accruing to refurbished buildings are properly reflected and that balance sheet debt restrictions do not *ex-ante* prohibit public authorities from refurbishing buildings which will deliver net economic benefits to the owner and Member State.
  - **Private Residential Buildings:** A simple, easily accessible, low interest rate, tax beneficial (ideally) retail energy efficiency financing offer is required that should be marketed widely through various trusted retail channels. The engagement of financial institutions and trusted local energy assessors in the supply of the

<sup>39</sup> The European System of Account (ESA) and Eurostat's methodology should support energy efficiency renovations in public buildings (Energy Performance Contracts); Please see: Eurostat. (2013). *Manual for statistics on energy consumption in households*. Retrieved from: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-GQ-13-003/EN/KS-GQ-13-003-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GQ-13-003/EN/KS-GQ-13-003-EN.PDF)

financing for such residential energy efficiency renovation loans is facilitated by strong measurement, reporting & verification and quality assurance, on-bill finance mechanisms and supported by the use of European Structural & Investment Funds.

- **Financial Institutions see Energy Efficiency Investment Supply for Buildings as a Key Use of European Structural and Investment Funds 2014-2020:** EEFIG members employed by or directly representing financial institutions believe the supply of energy efficiency investments for building renovation should be directly linked and supported as a priority by European Structural and Investment Funds, Horizon 2020 and ETS revenues (where applicable<sup>40</sup>) across all buildings segments as well providing project development and technical assistance funding. In compliance with the Common Provisions Regulation (CPR), additionality criteria should be respected for the use of ESIF and the ex-ante assessment for financial instruments should indicate the market gaps to which these funds are targeted, taking into account existing programmes and their relative success and structure.

## *2.6. Approaches and Instruments to Stimulate Energy Efficiency Investments in Buildings*

Having identified, assessed and prioritised the necessary drivers of energy efficiency investments, EEFIG members held a structured debate on the approaches and instruments through which these drivers can be addressed.

### *2.6.1. Policy-led Approaches to Drive Investment*

In order not to over simplify its discussions of “practical solutions”, EEFIG members were keen to underline that in practice there are a series of approaches available to financial institutions and policy-makers which can loosely be sub-divided into Policy-led Approaches (those depending upon policy leadership) and Market-led Approaches (those requiring leadership from market participants). EEFIG considers that both approaches should be developed simultaneously and in close dialogue with one-another.

Subsequent to the discussion on the approaches, EEFIG members made over thirty written submissions containing examples and analysis of existing and emerging financial instruments, whose increased use and wider development could further stimulate the market for energy efficiency investments in buildings.

This chapter summarises this debate and in its conclusions links the key drivers of demand for and supply of energy efficiency investment (summarised in section 2.5) with the relevant approaches and instruments described here.

EEFIG identifies the following Policy-led approaches:

1. **Optimise the Use of European Structural and Investment Funds for Energy Efficiency Investments in Buildings:** Ensure that there is a strong and coherent link between the National Building Renovation Strategies & Plans (Article 4 of Energy Efficiency Directive), National Energy Efficiency Funds (Article 20, EED) and the prioritisation and allocation to support energy efficiency investments in buildings from financing available under the 2014-2020 European Structural and Investment Funds, Horizon 2020 and ETS revenues (where

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<sup>40</sup> It is up to each EU Member State to decide on the use of the EU ETS revenues. The EU ETS Directive recommends that at least 50 % of these revenues should be used for climate action and its article 10 (3) mentions a variety of different possible uses including, among others, to finance research and development in energy efficiency and clean technologies in the sectors covered by the EU ETS Directive; or measures intended to increase energy efficiency and insulation.

relevant). EEFIG supports ex-ante conditionality with respect of EPBD and EED and notes that public funds should stimulate above “business as usual” interventions in buildings and that they should promote a move beyond “minimum energy performance requirement levels” (which should in principle be delivered by the market alone) subject to specific capacity building and project development assistance to support the finance supply chain. In general, the deeper the renovation is, the higher the public support intensity.

2. **Standardisation and Improvement of Buildings Certification and Energy Performance Certificates:** Coherence, reliability, usefulness, ease of access and accuracy were all terms used by EEFIG members on their “wish list” for improvements and standardisation of Energy Performance Certificates and Buildings certificates in EU Member States. Several participants felt that the effective implementation of EPBD article 18, together with a common calculation methodology for cost optimum calculation (Annex I, art 3) and a clear, user-friendly guide to actual implementation and comparison of calculations would be helpful.
3. **Open Source EU Buildings Energy Database:** EEFIG members proposed assessments of buildings energy usage and performance data availability and standardised processes for its collection, organisation and open access for data on the existing building stock, in line with Eurostat and Inspire Directive standards. Several EEFIG members also felt that the EU should prioritise the resolution of any issues around data ownership and privacy which might prevent easy and appropriate access and usage of anonymised energy data collected by energy companies on buildings energy use. EEFIG felt that an EU buildings energy usage database reflecting some of the learnings from the Californian Public Utility Commission project<sup>41</sup> and the US Department of Energy Buildings Performance Database would be helpful; and some members felt that any platform could also access social media and crowd-sourced content generation approaches to support this aim. EEFIG felt that it was key to involve financial institutions, on a voluntary basis, in the design of the data requirements and functional usability of such a database also considering the potential administrative costs.
4. **Industry and Finance supported National Buildings Renovation Roadmaps:** Long-term planning and engagement on buildings energy trajectories (considering a portfolio and life-cycle approach) should be developed in the context of National Buildings Renovation Strategies with and supported by the building industry and financial institutions.

### 2.6.2. Market-led Approaches to Drive Investment

EEFIG identified the following market-led approaches

1. **Common Underwriting and Investment Procedures:** Launch of an EU-wide initiative to develop a common set of procedures and standards for energy efficiency and building renovation underwriting for both debt and equity investments (references were made to the US Investor Confidence Project<sup>42</sup> as a relevant model initiative);
2. **More Proactive Engagement and Continuous Improvement and Usage of Energy Performance Certificates from Financial Institutions:** There is increasing evidence that Energy Performance Certificates are positively impacting the value for investors in

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<sup>41</sup> California Public Utilities Commission. (2012). *Energy Data Center: Briefing Paper*. Retrieved from: <http://www.cpuc.ca.gov/NR/rdonlyres/8B005D2C-9698-4F16-BB2B-D07E707DA676/0/EnergyDataCenterFinal.pdf>

<sup>42</sup> Investor Confidence Project. (2014). *Enabling Markets for Energy Efficiency Investment* [Website]. Retrieved from: <http://www.eeperformance.org/>



residential and commercial property portfolios<sup>43</sup>. The building and finance industry should engage in the process of improving and strengthening the quality of Energy Performance Certificates across the EU, using successful examples like KfW-Energieeffizienzhaus for German residential homes. This can be achieved through the input of higher quality and more detailed data, internal verification of Energy Performance Certificates, making Energy Performance Certificates publicly available and providing feedback to policy makers on Energy Performance Certificate upgrades from investors<sup>44</sup>.

3. **“Operational” Energy Performance Database:** “Better quality data” for energy efficiency investments has been an underlying, yet slightly generic, request from many financial institutions and industry stakeholders. An “operational” buildings energy performance database in each of the EU-28 Member States which conforms to shared data standards and collection protocols<sup>45</sup> and can be accessed and supported by bespoke portfolio benchmarking analysis such as those being piloted in the UK<sup>46</sup> by JLL and in France and Germany by the Green Rating Alliance<sup>47</sup>. This database can build upon the data increasingly available from smart-meter roll-out in the EU and the EPISCOPE-TABULA project<sup>48</sup>. To start, financial institutions and investors should clarify what data and data architecture they require and then working directly with policy-makers to determine how this is achieved - the US DOE’s Buildings Performance Database was cited as example<sup>49</sup>.
4. **Project Ratings:** A rating system could be designed to provide a transparent assessment of the technical and financial risks of buildings renovation projects and their contracting structure. Project ratings would simplify the financing process and reduce transaction costs and an independent central agency, with adequate resources can be responsible for the initial rating and its maintenance over time.
5. **Linking impact of building energy performance with investment performance:** Industry led initiatives can study the link between buildings energy performance and the impact on building investment performance. Risk analysis tools such as the IPD and RICS ‘IPD Eco-PAS’ tool, developed in the UK, enable risk management of buildings energy performance and can help clarify the level of risks associated with energy efficiency investment and raise investor confidence for this type of investment.

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<sup>43</sup> European Commission (DG Energy). (2013). *Energy Performance Certificates in buildings and their impact on transaction prices and rents in selected EU countries*. Retrieved from: [http://ec.europa.eu/energy/efficiency/buildings/doc/20130619-energy\\_performance\\_certificates\\_in\\_buildings.pdf](http://ec.europa.eu/energy/efficiency/buildings/doc/20130619-energy_performance_certificates_in_buildings.pdf)

Please see other examples below:

TiasNimbas. (2014). *Energy label increases home sales in the Netherlands* [Web log comment]. Retrieved from: <http://knowledge.tiasnimbas.edu/artikel/energy-label-increases-home-sales-netherlands>

Rijksoverheid. (2014). *Puntensysteem en energielabel* [Website]. Retrieved from: <http://www.rijksoverheid.nl/onderwerpen/huurwoning/puntensysteem-huurwoning/puntensysteem-en-energielabel>

<sup>44</sup> Example: Deutsche Asset and Wealth Management Real Estate. (2012). *Building Labels vs. Environmental Performance Metrics: Measuring What’s Important about Building Sustainability*. Retrieved from: [http://www.rreef.com/content/\\_media/Research\\_Sustainability\\_Metrics\\_in\\_the\\_Real\\_Estate\\_Sector-Oct\\_2012.pdf](http://www.rreef.com/content/_media/Research_Sustainability_Metrics_in_the_Real_Estate_Sector-Oct_2012.pdf)

<sup>45</sup> Such as those outlined in the documents below:

Eurostat. (2013). *Manual for statistics on energy consumption in households*. Retrieved from: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-GQ-13-003/EN/KS-GQ-13-003-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GQ-13-003/EN/KS-GQ-13-003-EN.PDF)

INSPIRE. (2010). *D2.8.III.2 Data Specification on Buildings – Technical Guidelines*. Retrieved from: [http://inspire.jrc.ec.europa.eu/documents/Data\\_Specifications/INSPIRE\\_DataSpecification\\_BU\\_v3.0.pdf](http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_BU_v3.0.pdf)

<sup>46</sup> JLL. (2014). *Real Estate Environmental Benchmark: An initiative by JLL and Better Buildings Partnership*. Retrieved from: <http://www.joneslanglasalle.co.uk/UnitedKingdom/EN-GB/Pages/Real-Estate-Environmental-Benchmark.aspx>

<sup>47</sup> Green Rating. (2014). [Website]. Retrieved from: <http://www.green-rating.com/>

<sup>48</sup> EPISCOPE. (2014). *IEE Project EPISCOPE* [Website]. Retrieved from: [www.episcope.eu](http://www.episcope.eu)

<sup>49</sup> Office of Energy Efficiency & Renewable Energy. (2014). *Buildings Performance Database* [Website]. Retrieved from: <http://energy.gov/eere/buildings/buildings-performance-database>

6. **Life cycle portfolio-wide sustainability programmes:** Long-term planning and integration of energy efficiency in portfolio management throughout buildings investment life cycle developed and supported by the energy efficiency industry and financial institutions.

### **2.6.3. Financial Instruments for Energy Efficiency Investment in Buildings**

A wide array of new and existing financial instruments and case studies were presented, discussed and assessed during EEFIG's work. In total, participants identified 16 different financial instruments for energy efficiency investing in buildings of which 7 instruments are considered "mature" and are widely used to fund energy efficiency investments directly or indirectly, and 9 other "emerging" instruments which are newer but have a varying potential to increase energy efficiency investing in EU buildings.

EEFIG's more detailed thinking and analysis of these financial instruments (with a full definition, strengths, weaknesses and best practice examples of each) is included in full in the Appendices of this report (Section 5.3). However, the following highlights can be drawn from EEFIG's financial instrument survey, working group and discussions:

- **Dedicated credit lines have the widest applicability in all buildings segments:** Thanks to the long-term track-record and backing of several of the EU's public financial institutions, together with private sector distribution partners, dedicated energy efficiency credit lines are widely used (and tailored to local conditions). They tend to provide good leverage and mixing for public with private finance, can offer long maturities and low costs and can be used as an instrument from within ESIF 2014-2020 or as a compliment. Often the promoting financial institutions of dedicated credit lines have strongly defined the development of the sector they serve and continue to help develop comprehensive frameworks, simplifying procedures and aiming to reduce processing times and other transaction costs via a "one-stop" standardised approach, lists of eligible materials and equipment (LEME) and strengthened MRV;
- **Energy Performance Contracting is growing in commercial and public buildings and has the potential to grow further with the emergence of public ESCOs and a factoring fund for Energy Performance Contracts:** Energy Performance Contract providers deliver a valuable and professional service to commercial and public buildings offering guaranteed savings, turnkey contracts and facilitating the market. Clarification of the accounting treatment for Energy Performance Contracts, the standardisation of energy performance contracting processes and procurement procedures<sup>50</sup>, client capacity building, additional project development assistance and ensuring that the fiscal and regulatory benefits to the building owner can be transferred to the Energy Performance Contract provider if it provides finance. The new concepts of public ESCOs, being developed by French regions, and the idea to launch a factoring fund for Energy Performance Contracts to buy Energy Performance Contracts from smaller originators thereby enabling them to source more client business are emerging instruments which could help support Energy Performance Contract market growth in different sectors;
- **Risk-sharing facilities are proving useful in many sectors and their growth as alternatives or complements to other instruments is important:** While risk-sharing facilities are not as widely used as dedicated credit lines at present, with more limited public budgets and the maturing of energy efficiency investing they have an increasingly important role to play. Risk sharing has the ability to remove part of the uncertainty and

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<sup>50</sup> Potentially through a consultation on various profiles of Energy Performance Contracts and the energy performance contracting process.



first-loss risks from energy efficiency investments thereby encouraging greater amounts of private sector capital to be deployed and making energy efficiency investing attractive to larger numbers of financial institutions. While risk sharing facilities can take time to structure and invite moral hazard if all risk is removed from the investments, they can be used in conjunction with ESIF 2014-2020 and can help accelerate the development of the emerging instruments. However, risk-sharing solutions proposed as “off-the shelf” as well as tailor-made financial instruments defined by ESIF 2014-2020 regulations, and GBER (General Block Exemption Regulation), are designed and structured based on previous experience and market analyses in order to mitigate moral hazard;

- **Increased allocation to and visibility of energy efficiency investing through direct and equity investments in real estate and infrastructure funds has significant potential:** The scale and reach of real estate and infrastructure funds is the highest among the mature financial instruments by a considerable margin (\$ 1.6 trillion in real estate funds globally in 2013<sup>51</sup> is probably at least a factor of 10x more than the world’s dedicated credit lines). Over 70% of real estate fund managers are integrating environmental management systems into their portfolio management and these investors lead the drive to reflect energy performance in the valuation of commercial buildings. However, energy efficiency investment growth would benefit from managers’ wider appreciation of the multiple benefits of energy efficiency investments, the higher the strategic profile of energy efficiency investments and the greater the focus from fund managers specifically on ensuring that long-term optimal energy efficiency measures are included in the general renovations of their portfolios;
- **Subordinated loans and leasing are presently “niche” instruments for energy efficiency in buildings:** While subordinated loans, covered bonds and leasing are very mature and widely used financial instruments in general, they are only used in sparing quantities for energy efficiency in specific buildings segments (if at all). As markets mature, subordinated loans have a potential role to replace grants in markets where the cash-flows from energy efficiency investments do not require high amounts of public grants. Covered bonds, presently unused for energy efficiency, are a low cost refinancing instrument with a dual recourse (on the asset and the issuing bank), which may come into its own when financial institutions with large portfolios of energy efficiency investments in their mortgage books look to refinance them. Covered bonds could be catalysed by banking regulations (or refinancing eligibility at European Central Bank) that make it more attractive to provide long-term finance to sustainable assets like energy efficiency investments. Leasing is an attractive finance alternative to suppliers of highly energy efficient equipment whose use is given additional public support in procurement in countries like Ireland, but is not as useful for deep renovations.
- **There is good potential for on-bill repayment and on-tax finance (PACE) to help grow the energy efficiency investment markets in commercial and residential buildings:** EEFIG participants see high growth potential for on-bill repayment and finance in general (tax and utility bill) across privately owned buildings classes. The improvement and additional certainty around the default risks together with their resolution of the split incentives (between owner and occupant and over time) and recent growth in the USA make them key emerging financial instruments to improve finance flows to energy efficiency investments to EU private sector buildings;
- **Energy efficiency funds and Energy service agreements show good potential in commercial and public buildings:** While both relatively newly emerging, specialist energy efficiency funds and energy service agreements are financial instruments with good

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51 GRESB. (2013). *2013 GRESB REPORT*. Retrieved from: [http://gresb.com/content/GRESB\\_Report\\_2013\\_Singlepage\\_HR.pdf](http://gresb.com/content/GRESB_Report_2013_Singlepage_HR.pdf)





prospects to grow energy efficiency investing in commercial and public buildings. Energy efficiency funds are attractive to SRI investors as they provide clear visibility to energy efficiency investments and their performance and their growth can be linked to the rise of Energy Performance Contract usage. Energy service agreements benefit from the support of strong traditional energy actors and often have 10 year horizons, but are somewhat fragmented and EFIG participants are not sure that they will ensure deep renovations;

- **Green bonds and citizens financing are emerging financial instruments with specific potential in specific buildings sectors:** The market for green bonds more than tripled in 2014 to \$35 billion and has provided some of the world’s leading bond issuers the opportunity to mainly refinance their green commercial real estate. The more precise the definition of “green commercial real estate” is and the greater the number of issuers, the stronger the knock-on impact will be on energy efficiency investing in the commercial and potentially public buildings sectors. Citizens financing has a high profile (in Germany particularly) for renewable energy or high-profile development projects and is being adapted for energy efficiency investments in multi-family homes and schools, yet needs time to gain critical mass.

EFIG’s assessment of the likely impact of each of its 16 identified financial instruments on energy efficiency investments in buildings was crystalized through a survey (whose results are in Table 4) where participants were asked to rate each financial instrument on its applicability to support the energy efficiency investment flow in each buildings market segment using the following scores:

- Score 0 if instrument is "not applicable" (Mature) or has “zero potential” (Emerging)
- Score 1 if instrument is "marginally useful" (Mature) or has “some potential” (Emerging)
- Score 2 if instrument is "useful" (Mature) or has “potential” (Emerging)
- Score 3 if instrument is "very useful" (Mature) or has “strong potential” (Emerging)

**Table 4:** Results of the EFIG survey on Financial Instruments for energy efficiency investments in buildings

<b><u>Mature Financial Instruments</u></b>	Commercial	Public	Public Rental	Private Rental	Owner Occupied
Dedicated Credit Lines	3	2	3	3	3
Energy Performance Contracting (Undertaken by Private Sector)	3	3	3	1	1
Risk-Sharing Facilities	2	1	2	2	2
Direct and Equity Investments in Real Estate and Infrastructure Funds	2	1	1	2	0
Subordinated Loan	1	1	1	1	1
Covered Bonds	1	1	1	0	0
Leasing	0	1	0	0	0
<b><u>Emerging Financial Instruments</u></b>	Commercial	Public	Public Rental	Private Rental	Owner Occupied
On-Bill Repayment	2	1	2	3	3
On-Tax Finance (PACE)	2	1	1	2	3
Energy Efficiency Investment Funds	3	2	2	1	1
Energy Services Agreement	3	3	2	1	1
Public ESCOS for Deep Renovation of Housing	0	0	3	2	2
Factoring Fund for Energy Performance Contracts	2	2	1	1	0
Public ESCOS for Deep Renovation of Public Buildings	0	3	3	0	0
Green Bonds	2	1	0	0	0
Citizens Financing	0	0	0	1	2

## 2.7. Connecting the Key Drivers with Specific Approaches

EEFIG members discussed and were able to connect some of the markets and policy-led approaches and the instruments identified in this chapter to some of the priority drivers of demand and supply of energy efficiency investments discussed in section 2. This analysis, shown in the following tables, provides the building blocks to develop a practical framework to stimulate energy efficiency investment in buildings:

**Table 5:** Key drivers for demand for energy efficiency investments and selected approaches and instruments

Demand Drivers	Approaches and/or Instruments Proposed	
<b>Applicable to All Buildings Segments</b> (Note: Key = "M" Markets-led; "P" Policy-led)		
<b>Buildings Regulation, Building Certification and Energy Performance Certificates</b>	<ul style="list-style-type: none"> <li>Mandatory building operational performance monitoring for sizeable energy users among commercial and public buildings;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Increase coherence, reliability, usefulness, ease of access and accuracy of mandatory Energy Performance Certificates delivering more useful and harmonised information for investors;</li> </ul>	P/M
	<ul style="list-style-type: none"> <li>Better represent financial institutions needs in the energy performance certification process;</li> </ul>	M
	<ul style="list-style-type: none"> <li>Consider mandatory "buildings passports" which contain all relevant building life cycle data for sizeable energy users among commercial and public buildings.</li> </ul>	P
<b>Standardisation</b>	<ul style="list-style-type: none"> <li>Develop Common Procedures and Underwriting Practice;</li> </ul>	M/P
	<ul style="list-style-type: none"> <li>Clear investment protocols to convert national buildings roadmap vision into energy efficiency investments;</li> </ul>	M
	<ul style="list-style-type: none"> <li>Increased flow of and standardised tenders for public buildings renovation;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Guidance and Education for Public sector buildings managers;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Development and dissemination of tool kits to asset owners and portfolio managers to develop renovation demand.</li> </ul>	M/P
<b>Strong, Stable and Well-enforced Regulatory Framework</b>	<ul style="list-style-type: none"> <li>Regulation should at least promote mandatory up-take of Energy Efficiency measures at key investment moments in a building's life-cycle;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Buildings operational performance ratings (for large commercial and public buildings) and regulatory enforcement of EPBD and EED should be strengthened within Member States;</li> </ul>	P
	<ul style="list-style-type: none"> <li>European Commission to act to promote Integrated Financial Reporting;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Regulation should focus on those who control refurbishment cycle of buildings and over buildings investment life-cycles;</li> </ul>	P
	<ul style="list-style-type: none"> <li>EU standardisation and performance tracking initiative (e.g. building on the Investor Confidence project) supporting</li> </ul>	P/M

	standard processes for building retrofits and open-source database of building retrofit with actual performance monitoring.	
<b>Tailored Financial Product Availability</b>	<ul style="list-style-type: none"> <li>• Demand for Finance is supported by the availability of the supply of appropriate and innovative finance products as sector stakeholders, installers and project developers (large and small) will hesitate to invest considerable resources to build a pipeline of energy efficiency projects where limited finance is available, or it is not tailor-made to the needs, or where the perception of funding risks are too high.</li> </ul>	M
	<ul style="list-style-type: none"> <li>• Support the further development of selected tailored financial instruments, such as: <ul style="list-style-type: none"> <li>○ Dedicated Credit Lines;</li> <li>○ Risk sharing facilities;</li> <li>○ Energy efficiency and sustainability approaches within Dedicated Real-Estate and Infrastructure Funds;</li> <li>○ Energy Performance Contracting;</li> <li>○ On-bill Repayments;</li> <li>○ Green Bonds for Green Buildings.</li> </ul> </li> </ul>	M/P
<b>Applicable Mainly to Commercial and Public Buildings</b>		
<b>Clear Business Case, Leadership and Awareness at Key Decision Maker Level</b>	<ul style="list-style-type: none"> <li>• Design formats for Comprehensive buildings operational energy performance database and “open source” energy usage data archive potentially using US models;</li> </ul>	M/P
	<ul style="list-style-type: none"> <li>• Implement Comprehensive buildings operational energy performance database and energy usage data archive potentially using US models;</li> </ul>	P
	<ul style="list-style-type: none"> <li>• Policy framework supports greater integration of sustainability risks into market fundamentals;</li> </ul>	P
	<ul style="list-style-type: none"> <li>• Public funds available for energy efficiency investments in line with National Buildings Renovation Strategies with a focus on cost optimal energy efficiency solutions.</li> </ul>	P
	<ul style="list-style-type: none"> <li>• EU standardisation and performance tracking initiative (e.g. building on the Investor Confidence project) supports the development of standard processes and open-sourced buildings energy usage database;</li> </ul>	M/P
	<ul style="list-style-type: none"> <li>• Resolve privacy issues around energy related performance data;</li> </ul>	P
<b>Applicable Mainly to Public Buildings</b>		
<b>Rules on Public Authority Procurement, Accounting and Reporting</b>	<ul style="list-style-type: none"> <li>• Key decision makers and facilities managers must be responsible for energy use reduction;</li> </ul>	M/P
	<ul style="list-style-type: none"> <li>• National public procurement procedures should be adapted in light of the need to renovate Public Buildings at scale, in particular regarding the procurement of energy performance contracts;</li> </ul>	P
	<ul style="list-style-type: none"> <li>• Public Authority Accounting should be reviewed to take a balanced view of the benefits as well as costs of energy efficiency investments in public buildings to be accounted for.</li> </ul>	P

<b>Facilitation/ Technical Assistance</b>	<ul style="list-style-type: none"> <li>Up-scaled public resources, in line with the regulatory framework, to be invested to develop investment pipelines and projects, relevant data, and provide more education, training leading to more energy efficient buildings renovation.</li> </ul>	P
<b>Applicable Mainly to Residential Buildings</b>		
<b>Simplicity and Reduced Transaction Costs</b>	<ul style="list-style-type: none"> <li>Implement a supportive fiscal regime designed to change homeowners' behaviour with respect of investing in the energy efficient renovation of their homes and minimum energy performance standards</li> </ul>	P

**Table 6:** Key drivers of supply for energy efficiency investments and selected approaches and instruments

<b>Supply Drivers</b>	<b>Instruments and Approaches Proposed</b>	
<b>Applicable to All Buildings Segments</b> (Note: Key = "M" Markets-led; "P" Policy-led)		
<b>Standardisation</b>	<ul style="list-style-type: none"> <li>Increase the uptake and use of standards at Member State level (as anticipated by EED Art 18) for Energy Performance Contracts developed (eg. Energy Performance Contract Code of Conduct) working with ESCOs and for MRV and legal documentation (eg. IPMVP);</li> </ul>	M
	<ul style="list-style-type: none"> <li>Mandatory training for procurement officers on energy efficiency (with project development and technical assistance where justified);</li> </ul>	P/M
	<ul style="list-style-type: none"> <li>Consider specialised insurance coverage for reduction of financial risk and support the development of a secondary market for Energy Performance Contracts.</li> </ul>	M
	<ul style="list-style-type: none"> <li>EU standardisation and performance tracking initiative (e.g. building on the Investor Confidence Project) supporting standard processes and open-source energy usage database.</li> </ul>	M/P
<b>Strong, Stable and Well-enforced Regulatory Framework</b>	<ul style="list-style-type: none"> <li>Energy Efficiency to be a cornerstone of Europe's 2030 Climate and Energy framework leading to stable long-term framework at EU, national and regional levels;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Effective transposition of EU regulation (Art 4 on National Strategies and Articles 7 &amp; 20 of EED);</li> </ul>	P
	<ul style="list-style-type: none"> <li>Upgrade Buildings Regulation Enforcement with Frequent and thorough checks as deterrent;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Support the deployment of on-bill mechanisms - through either of energy bills, tax bills or other relevant existing contracted payments (residential sector mainly);</li> </ul>	P
<b>Use of European Structural and</b>	<ul style="list-style-type: none"> <li>Can unlock investment supply through greater use of Risk sharing facilities by Managing Authorities of Operational Programmes;</li> </ul>	P

<b>Investment Funds 2014-2020 and Horizon 2020</b>	<ul style="list-style-type: none"> <li>Used in conjunction with, or to promote, dedicated credit lines, on-bill finance, the use of energy performance contracts and risk sharing facilities;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Emphasis on Project Development Assistance to build and deliver investment pipelines, relevant data, education, training and more energy efficient renovation in public buildings;</li> </ul>	P
	<ul style="list-style-type: none"> <li>Look to promote innovative and replicable energy efficiency renovation models in each sector through Horizon 2020 programme and in alignment with ESIF 2014-2020 structures (mutual benchmark and lessons learnt sharing).</li> </ul>	P
<b>Applicable Mainly to Commercial and Public Buildings</b>		
<b>Increased Investor Confidence and Changes in Risk Perception</b>	<ul style="list-style-type: none"> <li>Increase awareness of the link between energy performance certificate or green building labels and the “green” value of the building;</li> </ul>	M
	<ul style="list-style-type: none"> <li>Sustainability, Energy Efficiency and Carbon emissions should be fully integrated into the investment processes of Investment Managers and consultants;</li> </ul>	M
	<ul style="list-style-type: none"> <li>Energy efficiency needs to be embedded in standard risk assessment methods, selection and monitoring processes;</li> </ul>	M
	<ul style="list-style-type: none"> <li>Owners and lenders need better data for risk assessment, valuation of sustainability investments and for underwriting projects.</li> </ul>	M/P
<b>Measurement, Reporting &amp; Verification (MRV) and Quality Assurance</b>	<ul style="list-style-type: none"> <li>Clear, reliable and accountable MRV processes to be included in design of Common Procedures and Underwriting Practice (eg. IPMVP);</li> </ul>	M
	<ul style="list-style-type: none"> <li>Policy support to market organisation and accreditation in support of high quality standards, best practice and transparency;</li> </ul>	P
<b>Increased Investor Confidence and Changes in Risk Perception</b>	<ul style="list-style-type: none"> <li>Public funds available for energy efficiency investments in line with National Buildings Renovation Strategies with a focus on cost optimal energy efficiency solutions.</li> </ul>	P
<b>Applicable Mainly to Residential Buildings</b>		
<b>Simplicity and Reduced Transaction Costs</b>	<ul style="list-style-type: none"> <li>Develop new, simple, easily accessible, low interest rate, tax beneficial, retail energy efficiency offers is to be marketed widely through various trusted retail channels;</li> </ul>	M/P

## 2.8. EEFIG's Conclusions for the Buildings Sector

To achieve the deep energy efficient renovation of buildings in the EU, and deliver the multiple benefits which this brings, policy-makers and market participants need to work together to build upon the successful models which exist (permitting generalisation and expansion of these models across all of the EU), increase the market drivers and support selected instruments and approaches to scale-up energy efficiency investment activity in all Member States in order to allow for renovation rates and depths to grow quickly and significantly across the EU, while considering local, regional and national differences.

### 2.8.1. What are the most imminent challenges to overcome?

Emerging from EEFIG's interim analysis are several key themes which guide its recommendations as outlined in the final section of this chapter. These are:

1. **The multiple benefits<sup>52</sup> of energy efficient renovation of buildings must be captured and well-articulated, with evidence, and as a priority, to key financial decision makers (public authorities, buildings owners and managers and for householders):**

To achieve this EEFIG sees four requirements:

- a. The multiple benefits of renovation investments (energy and non-energy related) must be identified, measured and presented for each renovation in ways in which key financial decision makers can understand and respond to; and the reporting and stakeholder frameworks in which key decision makers sit must be required to look broadly<sup>53</sup> and account for more than just short-term energy savings;
  - b. The necessary evidence and data must be easy to access and cost effective to compile and assess in investment decision making processes;
  - c. Energy efficiency investments should be prioritised for key decision makers. Schemes like Australia's Energy Efficiency Improvement Scheme<sup>54</sup> or the UK's CRC Energy Efficiency Scheme<sup>55</sup> can cause large energy users to focus on energy savings, but there is no silver bullet;
  - d. Internal procedures, reporting and accounting systems should be adapted so as not to additionally handicap viable energy efficiency investments.
2. **Processes and Standards for Energy Performance Certificates, Energy Codes and their Enforcement need to be strengthened and improved:** A step change in how energy efficiency potential is identified, measured, reported and verified is needed and achieving this is fundamental to unlocking the market at scale. The feedback from financial institutions and markets participants<sup>56</sup> on the practicality and usefulness of existing energy performance certificates in Member States should be reflected. The rapid and repeated process of connecting this input to improve and strengthen approaches should be a priority, as well as the practical and effective local enforcement of existing regulations, especially minimum performance standards upon upgrade, sale or rental.

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<sup>52</sup> Meaning Energy Savings, Productivity Increases, Health Benefits, Acoustic Benefits, Social and Environmental Benefits and the many other site specific multiple benefits of energy efficiency. IEA. (2012). *Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements*. Retrieved from: [http://www.iea.org/publications/insights/insightpublications/Spreading\\_the\\_Net\\_FINAL.pdf](http://www.iea.org/publications/insights/insightpublications/Spreading_the_Net_FINAL.pdf)

<sup>53</sup> COM (2011) 681 final.

<sup>54</sup> Australian Government - Environment and Sustainable Development Directorate. (2014). *Energy Efficiency Improvement Scheme (EEIS)*. Retrieved from: [http://www.environment.act.gov.au/energy/energy\\_efficiency\\_improvement\\_scheme\\_eeis](http://www.environment.act.gov.au/energy/energy_efficiency_improvement_scheme_eeis)

<sup>55</sup> UK Government. (2015). *Policy: Reducing demand for energy from industry, business and the public sector* [Website]. Retrieved from: <https://www.gov.uk/government/policies/reducing-demand-for-energy-from-industry-businesses-and-the-public-sector--2/supporting-pages/crc-energy-efficiency-scheme>

<sup>56</sup> UNEP. (2014). *Sustainability Metrics: Translation and Impact on Property Investment and Management*. Retrieved from [http://www.unepfi.org/fileadmin/documents/UNEPFI\\_SustainabilityMetrics\\_Web.pdf](http://www.unepfi.org/fileadmin/documents/UNEPFI_SustainabilityMetrics_Web.pdf)



3. **Making it easy to get the right data to the right decision makers:** There are too many hurdles between the relevant and credible data and the decision makers who need it; and the processes and resources required to extract that data and qualify it appear specialist and costly. For energy efficiency investments in buildings to enter the mainstream, it must be as easy for a key property decision maker to understand and value the benefits of those investments as it is for other comparable decisions. This means that adequate, accessible, dependable and sortable data on buildings and their real, measured and verified energy performance should be identified and made available to facilitate the preparation of energy efficiency investment cases. The data structures must clearly enable the connection and validation of value increases (in the broadest sense) with energy efficiency investments<sup>57</sup>. A greater level of trust needs to develop between policy makers, financial institutions and the construction value chain to enable these process challenges and facilitate the mechanisms to expedite the data supply chain.
4. **Standards should be developed for each element in the energy efficiency investment process:** When a market is immature, high margins and competitive advantage may be available from tailored, one-off transactions. As markets develop, the commoditisation of the low value-added documentation and processing part of the transaction increases customer confidence and adds volume to the market – allowing customers and solution providers to focus exclusively on the core elements of value: In this case, energy savings, green value and the other multiple benefits of building renovations. The standardisation and adoption of best practice, standard national models for: Legal contracts, underwriting processes, procurement procedures, adjudication, measurement, verification, reporting, energy performance (contracts and certificates) and insurance; will add volume to the energy efficiency investment market and lower its costs of finance and transaction costs. The use of standardised MRV and legal documentation is particularly important to facilitate the bundling of investments for recycling to the bond market – creating a route to significant volumes of capital market finance. It would mutually reinforce the process of data collation and can also lead to national or regional “public knowledge centres” and experience hubs.
5. **Optimal use of European Structural and Investment Funds, public financial institutional schemes and ETS revenues through public-private financial instruments in 2014-2020 can boost investment volumes and help accelerate the engagement of private sector finance through scaled risk-sharing:** The scale of finance needed to upgrade the building stock means this cannot be achieved by the public sector alone. As such public finance needs to be targeted to address specific market failures and risk share with the private sector. Scalable models and successful case studies of dedicated credit lines, risk sharing facilities and on-bill repayment schemes abound. Member States should be encouraged to move away from traditional grant funding and look more to identifying the working models which best address the energy efficiency renovation investment needs in their buildings (as articulated in their National Building renovation Strategies). ESIF 2014-2020 funding (and other sources such as ETS revenues and public financial institution programmes) will be required to kick-start and complement national energy efficiency funds (EED Art 20) and energy supplier obligations (Art 7) to deliver Europe’s 2020 targets and National Buildings Renovation Strategies (Art 4). In this way opportunities for private finance to supplement public sector finance activity should be secured to maximise impact in terms of number of buildings refurbished and increasing the private funds leveraged for every euro of public money invested.

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<sup>57</sup> Bullier, A., Sanchez, T., Le Teno, J. F., Carassus, J., Ernest, D., & Pancrazio, L. (2011). *Assessing green value: A key to investment in sustainable buildings*. Retrieved from: <http://www.buildup.eu/sites/default/files/content/Assessing%20Green%20Value%20-%20Bullier,%20Sanchez,%20Le%20Teno,%20Carassus,%20Ernest%20and%20Pacrazio%20-%20ECEEE%202011.pdf>



## 2.8.2. EEFIG Buildings Recommendations to Policy Makers

EEFIG members, and their respective institutions, are convinced that the level of energy efficiency investment in Europe's buildings can, and should, increase dramatically from current levels with the right reforms in place to address persistent market failures. This will require concerted policy-led and markets-led activities which act on the drivers of energy efficiency investment supply and the demand for building renovation. Not only will this require a coherent and timely transposition of existing European framework legislation, as well as the strong enforcement of buildings regulations, but it will need the rapid scaling of working investment models across Member States together with an historic level of communication and co-activity.

To support and enable European policymakers to focus their resources on the most critical areas, EEFIG provides the following six priority areas for consideration:

- 1. Existing EU Legislation and local Buildings Regulations should be fully implemented and consistently enforced across EU Member States:** In the short-term, EEFIG members are confident that there is a significant amount of energy efficiency investment which can be unlocked by the full transposition of the Energy Efficiency Directive and enforcement of the Energy Performance of Buildings Directive<sup>58</sup> by Member States. In addition, EEFIG promotes the stronger enforcement of buildings regulations (in particular the energy performance certification of buildings) by Member States, increased communality among energy performance certificates and the smart use of ESIF 2014-2020, and other sources, to deliver emissions reductions among multiple benefits from energy efficiency investments;
- 2. Future Regulatory Pathways for EU Buildings should provide concerted and consistent regulatory pressure to improve buildings efficiency:** Energy waste in buildings through inefficient design, inefficient use, inefficient systems, age, habit or inertia when cost effective renovation alternatives exist must be rapidly phased out through effective regulation and incentives. In addition, the energy performance of buildings should be properly priced into property sale or rental value. At the end of this period energy efficiency upgrades should be mandatory for those wishing to sell or rent a property (the value of energy performance certification needs to increase). It should be clearly signalled to those who wish to act in the near-term to refurbish buildings to high performance levels (above business as usual trends) that incentives will be available (e.g. Fiscal benefits, soft loans supported by dedicated credit lines, risk sharing instruments grant schemes where appropriate). For owners, waiting to refurbish wasteful buildings should be an increasingly uneconomic alternative and the inclusion of optimal energy efficiency measures in regular buildings renovations should be made "market-standard". The importance of leadership and signalling for energy efficiency investments should not be underestimated in the context of the EU's 2030 Climate and Energy package; the headline positioning of energy efficiency targets would impact how EU buildings' energy use will decrease and decarbonize from now until 2050 with intermediate milestones. If the EU wants to unlock the enormous potential for energy savings in its existing building stock then it clearly requires bold policy intervention going beyond the strong implementation of existing legislation;

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<sup>58</sup>With specific attention on implementation of article 18 and a common calculation methodology for cost optimum calculation (Annex I, art 3).

3. **High quality decisions and low transaction costs can only be delivered by easily accessible data and standard procedures:** EEFIG has identified a series of best practice initiatives focused on serving the need for better data on buildings energy performance<sup>59</sup> as well as the need to simplify and standardise the steps in the buildings energy efficiency investment process. In addition, EEFIG members note that the operational buildings energy consumption data recorded by smart meters and retained by energy suppliers in their public service capacity should be made available to customers, buildings owners, their advisors and accredited third parties in an anonymised way having resolved any legacy ownership or privacy issues. EEFIG supports the use of specific policy levers to drive cost effective energy efficiency investment decisions higher in the key decision-makers priorities, examples include: Energy Efficiency Improvement Scheme in Australia, the CRC energy efficiency scheme in the UK and minimum performance standards for EU buildings;
4. **Reporting, accounting and procurement procedures must facilitate, and not hinder, appropriate energy efficiency investments in public buildings:** The frameworks which motivate and guide public buildings managers must support the immediate prioritisation of long-term, cost optimal energy efficiency renovations. The public accounting, reporting and procurement hurdles which prevent buildings managers from making good quality, long-term decisions for their assets under management must be exposed and addressed as a priority. Interpretations of EUROSTAT rules on public debt and deficit should not prejudice investment in energy efficiency in public buildings. Procurement procedures for the energy efficient renovation of public buildings should reflect the operational as well as capital expenditure implications of public procured assets, especially in countries where existing frameworks are too cumbersome;
5. **The “at-scale” energy efficiency upgrade of residential buildings can only happen with a concerted address of the specific investment demand and supply drivers of this segment and the engagement and alignment of retail distribution channels:** Homeowners are only likely to respond to a simple energy efficiency investment offer which has a clear value-proposition in the context of a clear long-term regulatory pathway for buildings energy efficiency. Initially, the strong alignment of interests among those entities with retail distribution networks (banks, energy companies, local government) is necessary along with facilitating mechanisms such as adapted, low cost measurement, reporting & verification and quality assurance, on-bill finance, fiscal benefits and long-term, low cost loans supported with risk-sharing mechanisms and tailored grant support for key communities. The full transposition of the Energy Efficiency obligations under article 7 of the Energy Efficiency Directive, and its links with Article 4, together with access to appropriate low, cost retail finance facilities and pipeline development assistance funding will support this segment. It is important to note that given the income distribution between and within countries there are some segments of the population for whom loans will never be appropriate and the public sector will need to substantially fund these renovations;

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<sup>59</sup> Sourced from:

Office of Energy Efficiency & Renewable Energy. (2014). *Buildings Performance Database* [Website]. Retrieved from: <http://energy.gov/eere/buildings/buildings-performance-database>

Investor Confidence Project. (2014). *Enabling Markets for Energy Efficiency Investment* [Website]. Retrieved from: <http://www.eepperformance.org/>

6. **Energy efficiency investment supply targeted through greater project development and technical assistance, the smart deployment of ESIF 2014-2020 and Horizon 2020 and up-scaling of financial models that work:** As the amount of ESIF money is insufficient compared to the investments required, the use of grants should be limited to clear market failures and project development assistance. On the other hand, the smart combination of public and private funding sources can significantly increase the impact and amount of energy efficiency investments in buildings and deliver meaningful emissions reductions whilst also delivering co-benefits such as job creation, health benefits, energy security etc., therefore making worthy use of public money. Public money should be used to lever private funding in support of energy efficiency investments which go beyond “business as usual”, exceed the minimum energy efficiency requirement and regulatory standards or deliver significant long-lasting energy savings. EEFIG supports the layering-in of greater amounts of public support to reduce interest rates, provide public guarantees on energy efficiency investments and increase the attractiveness of more ambitious deep renovations through the increased use of dedicated credit lines and risk sharing facilities.

### **2.8.3. EEFIG Buildings Recommendations to Market Participants**

EEFIG members, and their respective institutions, are convinced that market participants, especially financial institutions, need to work closely with policy-makers and lead on the market-led activities which are highlighted in this report. Policy-led instruments and approaches cannot deliver the multiple benefits of energy efficiency alone. This will also require an increased focus, resource allocation and support to drive energy efficiency investments in buildings from market participants.

To support and enable markets participants to focus their resources on the most critical areas in the delivery of these beneficial outcomes, EEFIG provides the following five priority areas for consideration:

1. **Engage key decision makers (owners and managers) with a clear business case that raises their awareness of the multiple benefits of buildings’ energy efficiency renovation with evidence:** To achieve this EEFIG sees four main requirements:
  - i. The multiple benefits<sup>60</sup> of energy efficiency investments, including the impact on investment performance, must be measured and presented in ways in which key decision makers can understand and react to and the reporting and stakeholder frameworks in which key decision makers sit must be required to look more broadly and account for more than just short-term energy savings;
  - ii. The necessary evidence and data must be made easy to access and cost effective to compile with continued effort to improve financial estimates of the health, comfort and productivity benefits of green buildings;
  - iii. Energy efficiency investments should be prioritised for key decision makers through schemes like Australia’s Energy Efficiency Opportunity Program or the UK’s CRC Energy Efficiency Scheme which have raised these investments up the internal priority ladder successfully;
  - iv. Internal procedures, reporting and accounting systems should be adapted so as not to additionally handicap sensible energy efficiency investments.

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<sup>60</sup> Meaning Energy Savings, Productivity Increases, Health Benefits, Acoustic Benefits, Social and Environmental Benefits and the many other site specific multiple benefits of energy efficiency. IEA. (2012). *Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements*. Retrieved from: [http://www.iea.org/publications/insights/insightpublications/Spreading\\_the\\_Net\\_FINAL.pdf](http://www.iea.org/publications/insights/insightpublications/Spreading_the_Net_FINAL.pdf)

2. **Make it easy to get the right data to the right decision makers:** This means that adequate, accessible, robust and comparable data on retrofitted buildings and their actual, measured and verified energy and financial performance should be identified, freed from privacy and ownership issues and made available to facilitate the preparation of energy efficiency investment cases. The data structures must clearly enable the connection and validation of value increases (in the broadest sense) with energy efficiency investments<sup>61</sup>.
3. **Improve the Processes and Standards for Buildings Labels, Energy Performance Certificates and Energy Codes:** Financial institutions and markets participants can play a useful role to strengthen the implementation of existing buildings labels, certificates and energy codes in Member States and provide feedback on required improvements through a rapid and continual process of connecting their “market feedback” and views to improve and strengthen policy approaches as a priority. This can be delivered through the on-going improvement, connection and enhancement of the voluntary buildings environmental assessment methods to better reflect the multiple benefits of buildings’ energy efficiency investments and deliver decision makers better quality energy efficiency investment data to support their decisions<sup>62</sup>.
4. **Standards should be developed for each element in the energy efficiency investment process:** The standardisation and adoption of standard models for: Legal contracts, underwriting processes, procurement procedures, adjudication, forecasting savings potential, measurement, verification, reporting, energy performance contracts and certificates, post-completion project hand-over, building valuation and insurance; will add volume to the energy efficiency investment market and lower its costs of finance and transaction costs as it professionalises.
5. **Leverage of private sector finance through optimal use European Structural and Investment Funds 2014-2020 and Member States’ funds:** Private sector financial institutions need to more pro-actively engage with managing authorities, as well as with other public funding sources and public financial institutions, to help support the use of financial instruments to boost energy efficiency investment volumes from 2014-2020 using ESIF in the most efficient ways. Off-the-shelf financial instruments and tailor made instruments developed, in accordance with ex-ante assessments, which focus on energy efficiency in buildings will need adequate structuring and distributional support from private financial institutions as well as final recipients in collaboration with the public sector. Greater resource allocation to and focus on energy efficiency investing in buildings during this period will deliver more efficient outcomes for EU Funds and business opportunities for EU financial institutions.

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<sup>61</sup> Bullier, A., Sanchez, T., Le Teno, J. F., Carassus, J., Ernest, D., & Pancrazio, L. (2011). *Assessing green value: A key to investment in sustainable buildings*. Retrieved from: <http://www.buildup.eu/sites/default/files/content/Assessing%20Green%20Value%20-%20Bullier,%20Sanchez,%20Le%20Teno,%20Carassus,%20Ernest%20and%20Pacrazio%20-%20ECEEE%202011.pdf>

<sup>62</sup> Triple E Consulting. (2014). *Market study for a voluntary common European Union certification scheme for the energy performance of non-residential buildings*.



### 3. Corporate Energy Efficiency Investments (Industry & SMEs)

"Energy efficiency is central to defending Europe's competitiveness and local job creation, strengthening energy security and delivering sustainable growth. Indeed, energy efficiency remains the single lowest cost energy solution to keep the energy bills for European industry and citizens under control and help the EU to meet its climate targets." – Dr. Bernd Drouven, Chairman of the Management Board at European copper producer Aurubis AG, active member of EEFIG.

#### 3.1. Opportunity for EU Corporate Energy Efficiency (Industry & SME focus)

The EU's industrial sector is responsible for just over a quarter of European final energy consumption (26%<sup>63</sup>) and is a world leader in energy efficiency<sup>64</sup>. Energy efficiency in EU manufacturing industries has improved on average by 1.3% per annum over the last 15 years (reducing final energy use by 15% in aggregate since 2000), yet the speed of progress has been reduced since the financial crisis although the potential additional savings with a 2030-2050 horizon are substantial<sup>65</sup>. The break-down among various industrial sub-sectors is shown here (Figure 4).

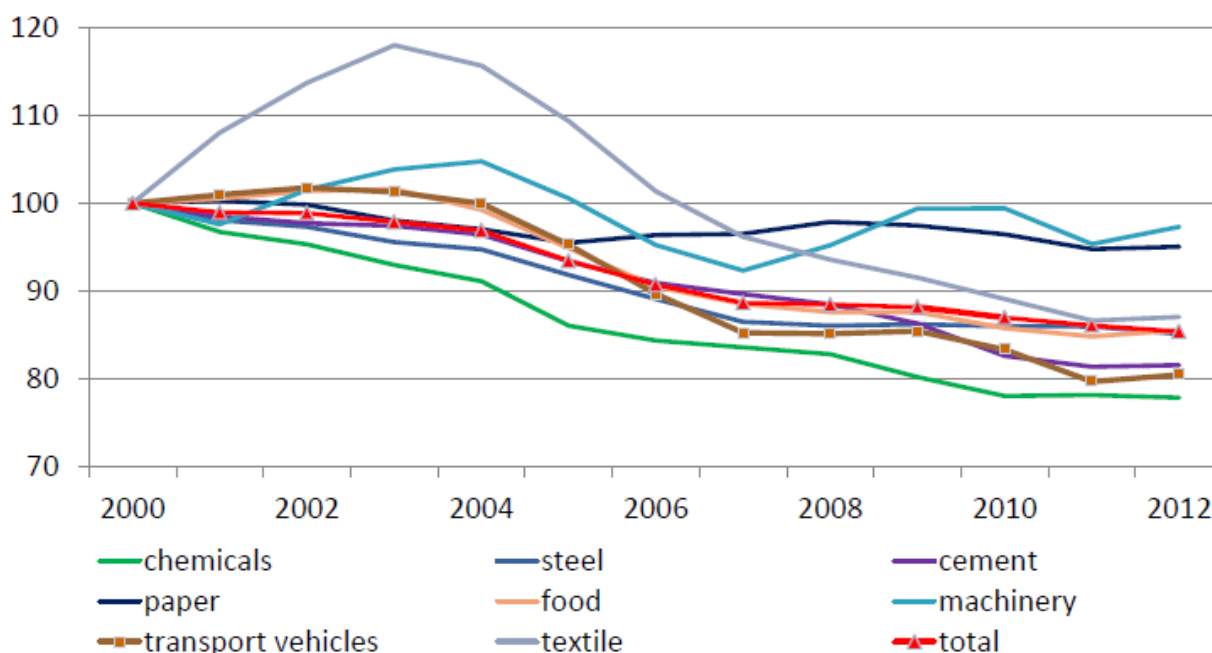


Figure 4: Energy Efficiency Index (ODEX) in EU Manufacturing Industries calculated by ODYSSEE-MURE project and published November 2014, using industry data rebased from year 2000.

European companies are highly heterogeneous, however, and there are literally thousands of industrial processes, millions of SMEs and countless ways in which energy efficiency projects can be designed and implemented. Energy efficiency has clearly contributed positively to EU industrial competitiveness, enabling companies to proactively manage energy price increases in Member

<sup>63</sup> Enerdata & Odyssee. (2014). *Energy Efficiency Trends in Industry in the EU* [PDF document]. Retrieved from: <http://www.odyssee-mure.eu/publications/efficiency-by-sector/industry/industry-eu.pdf>

<sup>64</sup> Evidenced by Energy Intensity and Energy Productivity measures for OECD Europe sourced from: IEA. (2014). *Energy Efficiency Market Report 2014 – Market Trends and Medium-Term Prospects*.

<sup>65</sup> German Government - Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). & Fraunhofer Institute. (2012). *Policy Report: Contribution of Energy Efficiency Measures to Climate Protection within the European Union until 2050*. Retrieved from: [http://www.isi.fraunhofer.de/isi-wAssets/docs/e/de/publikationen/BMU\\_Policy\\_Paper\\_20121022.pdf](http://www.isi.fraunhofer.de/isi-wAssets/docs/e/de/publikationen/BMU_Policy_Paper_20121022.pdf)



States and retain export shares<sup>66</sup>, yet experts believe that many of the completed measures are just the ‘low hanging fruits’ (with relatively short payback times<sup>67</sup>) assessed on narrow measures of economic pay-back without considering the wider benefits of energy efficiency investments: The untapped energy efficiency potential remains great<sup>68</sup>.

Studies show that EU industrial energy efficiency can continue to improve at rates that are similar to those seen in the past, although the expected annual rate of efficiency gains will be strongly connected to energy price evolution, discount rates applied by host companies, technology development and relative “policy intensity”<sup>69</sup>. Both IEA<sup>70</sup> and the MURE database on energy savings potentials<sup>71</sup> model energy savings based upon three different policy scenarios (“Current” / “Low intensity”; “New Policies” / “High intensity” and “450 scenario” / “Technical”); and while the scenarios and modelling techniques are distinct, it is clear that energy efficiency outcomes (and therefore associated investments) are directly linked to policymakers’ abilities to ensure economically efficient uptake of best energy saving technologies and operating practices, reducing transaction costs and removing barriers.

In the EU there are 22 million small and medium-sized enterprises (SMEs) which provide around 89 million jobs and represent 99% of all enterprises<sup>72</sup> but seldom have the capacity to systematically exploit energy savings. While absolute energy use per firm in SMEs (industrial and non-industrial), and non-energy intense companies, is lower than in large, energy-intensive industrial companies, focusing on energy end-use efficiency in SMEs and in large, non-energy intensive companies is often very cost effective. Eurochambers estimates a short-term 10-20% “win-win” energy reduction potential among its 20 million EU members. SMEs may have not implemented even basic measures as they may not have sufficient management time, capability or dedicated expertise to do so and therefore the market share of low cost potential for energy savings in SMEs is particularly high<sup>73</sup>.

Financing corporate energy efficiency investments is complex because the sectors themselves are so diverse in terms of their scope, size, structure and exposure to global competition. Companies also have very different financial capacity to make the required upfront investment in times of strong market competition and volatile energy prices. In addition, the visibility of corporate energy efficiency investments is decreased as nearly 60% of energy efficiency investments in Industry are currently “self-financed”<sup>74</sup>; with a Eurochambres survey confirming the higher figure of 76% of SMEs funding energy efficiency investments with their own funds<sup>75</sup>.

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<sup>66</sup> SWD(2014) 20 - Report on energy prices and costs. Retrieved from: [http://ec.europa.eu/clima/policies/2030/documentation\\_en.htm](http://ec.europa.eu/clima/policies/2030/documentation_en.htm)

<sup>67</sup> Example: Data from the Industrial Assessment Centers Database at Rutgers University (USA) shows that of the Top-50 Assessments, requested over 88,000 times, only two have payback periods of over 3 years.

<sup>68</sup> IEA (2014) “*Capturing the Multiple Benefits of Energy Efficiency*” found here: <http://www.iea.org/Textbase/npsum/MultipleBenefits2014SUM.pdf>

<sup>69</sup> Fraunhofer-Institute for System and Innovation Research. (2009). *Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries*. Retrieved from: [http://ec.europa.eu/energy/efficiency/studies/doc/2009\\_03\\_15\\_esd\\_efficiency\\_potentials\\_final\\_report.pdf](http://ec.europa.eu/energy/efficiency/studies/doc/2009_03_15_esd_efficiency_potentials_final_report.pdf)

<sup>70</sup> IEA. (2014). *Special Report: World Energy Investment Outlook*. Retrieved from: <http://www.iea.org/publications/freepublications/publication/WEI02014.pdf>

<sup>71</sup> Fraunhofer-Institute for System and Innovation Research (Coordinator), Enerdata., ISIS., Technical University of Vienna., & Wuppertal Institute. (2014). *Data Base on Energy Savings Potentials*. [Website]. Retrieved from: <http://www.eepotential.eu/description.php>

<sup>72</sup> European Commission. (2014). *A Partial and Fragile Recovery: Annual Report on European SMEs 2013/2014 Final Report*. Retrieved from: [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2014/annual-report-smes-2014\\_en.pdf](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2014/annual-report-smes-2014_en.pdf)

<sup>73</sup> IEA. (2014). *Energy end-use policies and programs towards industrial SMEs – the case of Japan, Belgium, Spain and Sweden” IEA IETS Annex XVI Energy Efficiency in SMEs Task I*. [PDF Document]. Retrieved from: [http://www.iea.org/media/workshops/2014/eu/smenovworkshop/Patrik\\_Thollander\\_Session1.pdf](http://www.iea.org/media/workshops/2014/eu/smenovworkshop/Patrik_Thollander_Session1.pdf)

<sup>74</sup> IEA. (2014). *Special Report: World Energy Investment Outlook*. Retrieved from: <http://www.iea.org/publications/freepublications/publication/WEI02014.pdf>

<sup>75</sup> EUROCHAMBRES. (2014). *Obstacles to Invest in EE: Eurochambres Survey 2009, n=2154 businesses from 12 European countries [Slide #9]*. Retrieved from: [http://www.fedarene.org/wp-content/uploads/2014/05/Eurochambres\\_Energy-Efficiency-in-the-SME-sector.pdf](http://www.fedarene.org/wp-content/uploads/2014/05/Eurochambres_Energy-Efficiency-in-the-SME-sector.pdf)



The members of EEFIG identify a clear opportunity to dramatically grow and improve energy efficiency investments in Europe's industrial and non-industrial companies of all sizes to deliver competitive advantages globally and locally. EEFIG identifies a need to raise the priority of energy efficiency at executive board level, incorporate energy efficiency investments within the standard corporate finance dialogue and process and to encourage firms to be more open with the investment horizons, scope and returns for energy efficiency investments which they will accept. While credit markets fluctuate, at the time of writing there is no shortage of capital for large firms yet energy efficiency opportunities are often not strategically pursued by them – and their financiers are not building technical capacity nor pushing energy efficiency opportunities; whereas for SMEs the supply of long-term finance and the availability of project development resources is a greater barrier.

### *3.2. Drivers of Demand for and Supply of Corporate Energy Efficiency Investments*

To interpret EEFIG's prioritisation of the drivers of corporate energy efficiency investments in the EU, a clear definition of terms and characterisation of the segments addressed is required. Furthermore, EEFIG divides its drivers into those which address the demand for energy efficiency investments (the creation of investible corporate energy efficiency projects) from those which address the supply of finance (availability of appropriately structured, cost and term internal or external funding) for corporate energy efficiency investments. The following are the definitions of the market segments as understood and agreed by consensus by EEFIG members to guide its survey work and order the group's thinking. The key driver definitions can be found in the Appendices in Section 5.2.2.

#### *3.2.1. Market Segments*

- 1. Large Energy Intensive Companies:** EEFIG has tried to define its segments based upon how financial institutions segment their clients: Primarily by balance sheet capacity – a financial measure of “size”. For the purposes of this report EEFIG determined that “large” would refer to companies with a total balance sheet equal to or greater than Euro 300 million. EEFIG defines “Energy Intensive” as covering companies which use significant quantities of energy<sup>76</sup> as part of their primary economic activities including the following industries: Aerospace, Automotive, Cement, Chemical, Food & Drink, Glass, Metals, Pharmaceuticals, Pulp & Paper, Refining and Shipping<sup>77</sup>. Studies show that while energy inputs are a significant component of the cost-base of large energy intensive companies, there are a wide array of energy management practices used, management priorities and significant energy savings which exist.
- 2. Large Non-Energy Intensive Companies:** This sector covers all companies whose total balance sheet is equal to or exceeds Euro 300 million in size and whose primary production value-added does not contain use more than 3% of energy cost. Key sectors which EEFIG has used to illustrate this category include: Agriculture, Banking, Commercial, IT & Communications<sup>78</sup>, Mechanical Metalwork, Retail, Services and Wood Manufacture. While large non-energy intensive companies use less energy, it is precisely for this reason that they may have spent less management time focused on the energy vertical and therefore

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<sup>76</sup> As a general guide. EEFIG sees an energy-intensive company as a company with energy costs in relation to the production value of more than three percent – as used in Sweden.

<sup>77</sup> Adapted by EEFIG from classifications used in Table 2.4 of:

UNIDO. (2011). *Barriers to industrial energy efficiency: a literature review*. Retrieved from: [http://www.unido.org/fileadmin/user\\_media/Publications/Research\\_and\\_statistics/Branch\\_publications/Research\\_and\\_Policy/Files/Working\\_Papers/2011/WP102011%20Barriers%20to%20Industrial%20Energy%20Efficiency%20-%20A%20Literature%20Review.pdf](http://www.unido.org/fileadmin/user_media/Publications/Research_and_statistics/Branch_publications/Research_and_Policy/Files/Working_Papers/2011/WP102011%20Barriers%20to%20Industrial%20Energy%20Efficiency%20-%20A%20Literature%20Review.pdf)

<sup>78</sup> Excluding those businesses which are dedicated to managing data centres which are Energy Intensive.

may still offer some very attractive energy efficiency investments with high returns as a part of a new energy management approach. Furthermore, those large non-energy intensive companies with high profile brands are experiencing greater stakeholder and customer pressure to reduce their emissions footprint and therefore investing in energy efficiency now has a higher priority.

3. **“Mid-Cap” Companies:** EEFIG defines “mid-cap” companies as those from all sectors whose balance sheet size is between Euro 43-300 million. In this segment we find many of the German *Mittelstand*, northern Italian family-held manufacturers and French ETI (*entreprises de taille intermédiaire*) among others. Energy efficiency performance in this segment varies widely and members of EEFIG describe mixed experiences, from those energy intense mid-sized firms which are highly energy efficient often for competitive reasons, to those where there are energy efficiency projects with payback periods of less than 1 year which remain outstanding.
4. **SMEs:** EEFIG defines SMEs as companies having a maximum balance sheet size of Euro 43 million coinciding with the financial boundary established by the EU Commission in their 2005 definition of SMEs<sup>79</sup>. As EEFIG looks at energy efficiency investment flows from a financial perspective, it chose not to use supplementary size criteria such as total workforce or revenues.

### ***3.2.2. Analysis and Prioritisation of the Drivers of Demand for Corporate Energy Efficiency Investments***

The EEFIG group discussed and identified 38 drivers affecting corporate demand for energy efficiency investments in its different segments and subsequently over 90 EEFIG participants answered an online survey requiring their weighting in importance<sup>80</sup>. Table 7, below, provides a summary of the results of this exercise (each driver is ranked 1-38 in terms of its survey score for each company segment; top ranks are coloured with darker blue) and the group’s observations and analysis of these results follow:

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<sup>79</sup> European Commission. (2005). *The new SME definition: User guide and model declaration*. Retrieved from [http://ec.europa.eu/enterprise/policies/sme/files/sme\\_definition/sme\\_user\\_guide\\_en.pdf](http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf)

<sup>80</sup> a full explanation of EEFIG Driver Survey methodology and approach can be found in the Appendix.

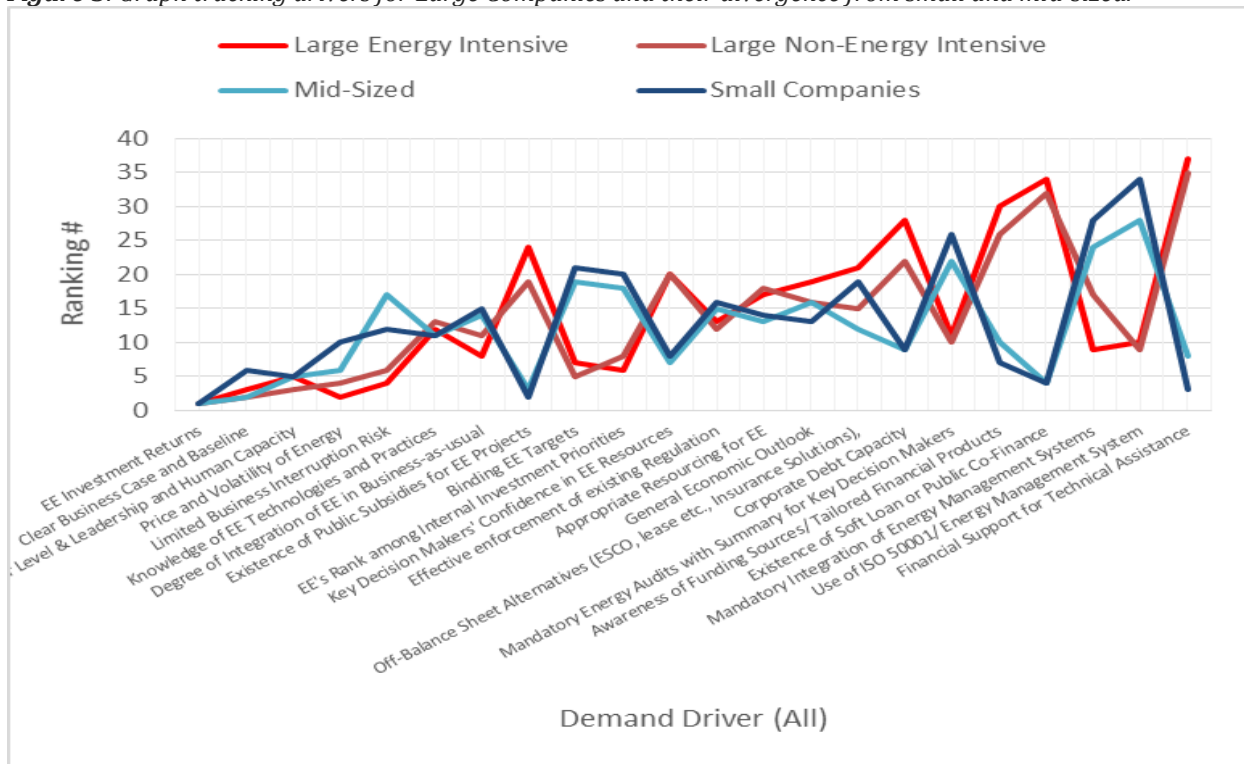
**Table 7: EEFIG ranking of key drivers affecting demand for corporate energy efficiency investment by segment.**

Company Segment	Large EN Intensive	Large Non-EN Intensive	Mid-Cap	SMEs	Average Rank
EE Investment Returns	1	1	1	1	1
Clear Business Case and Baseline	3	2	2	6	3.25
Awareness at Key Decision Maker Level & Leadership and Human Capacity	5	3	5	5	4.5
Price and Volatility of Energy	2	4	6	10	5.5
Limited Business Interruption Risk	4	6	17	12	9.75
Knowledge of EE Technologies and Practices	12	13	11	11	11.75
Degree of Integration of EE in Business-as-usual	8	11	14	15	12
Existence of Public Subsidies for EE Projects	24	19	3	2	12
Binding EE Targets	7	5	19	21	13
EE's Rank among Internal Investment Priorities	6	8	18	20	13
Key Decision Makers' Confidence in EE Resources	20	20	7	8	13.75
Effective enforcement of existing Regulation	13	12	15	16	14
Appropriate Resourcing for EE	17	18	13	14	15.5
General Economic Outlook	19	16	16	13	16
Off-Balance Sheet Alternatives (ESCO, lease etc., Insurance Solutions),	21	15	12	19	16.75
Corporate Debt Capacity	28	22	9	9	17
Mandatory Energy Audits with Summary for Key Decision Makers	11	10	22	26	17.25
Awareness of Funding Sources/ Tailored Financial Products	30	26	10	7	18.25
Existence of Soft Loan or Public Co-Finance	34	32	4	4	18.5
Mandatory Integration of Energy Management Systems	9	17	24	28	19.5
Use of ISO 50001/ Energy Management System	10	9	28	34	20.25
Financial Support for Technical Assistance	37	35	8	3	20.75
Competition and limited Cost Pass-through	14	28	25	17	21
Corporate Energy Culture Encompassing Holistic Energy Strategy with Voluntary Agreements & Targets	15	14	29	30	22
Policy Benchmarks and Energy Performance Standards	16	23	26	27	23
Full Benefits of Energy Efficiency	25	25	20	23	23.25
Fully Considering any Hidden Costs of EE	29	27	21	22	24.75
Public Recognition & Image	22	7	32	38	24.75
Not Using Payback Period as sole Evaluation Criteria	36	29	27	18	27.5
Existence of Multiple Refinancing Options	33	33	23	25	28.5
Stakeholder Pressure	23	21	34	37	28.75
Scope of Existing Industrial EE Policies	27	31	31	31	30
Facility-level Energy Security	18	36	36	32	30.5
Environmental Reporting Requirements	26	24	38	36	31
Existence of Utility Mandated Engagement	38	38	30	24	32.5
Clear Accounting Standards	32	30	35	35	33
State Aid Clearance for EE	35	37	33	29	33.5
New Technology, R&D and Innovation Focus & Skills	31	34	37	33	33.75

According to the EEFIG survey, Energy efficiency investment returns<sup>81</sup> is, perhaps unsurprisingly, the #1 demand driver across all corporate segments irrespective of size, quickly followed by a clear business case & baseline and awareness at key decision makers level, human capacity and leadership. However, from the fourth demand driver onwards the company segments begin to drive the rankings differently with large companies (irrespective of energy intensity) and small and medium sized companies diverging in the relative rankings of their supply drivers as illustrated in Figure 4. Interestingly, large companies drivers move together and small and mid-sized also track one another:

<sup>81</sup> Contrasting with results from Anderson and Newell (2002) on the outcome of the world's largest energy information program for industry, the American IAC, showed a significant factor which was not investment return but absolute investment cost (ie how high the actual investment was)

Figure 5: Graph tracking drivers for Large Companies and their divergence from small and mid-sized.



In addition, EEFIG members highlight the following key findings from their survey:

- Price of energy and volatility is a much stronger demand driver (#2) for large energy intense companies than for SMEs in general (#10)<sup>82</sup>;
- The existence of public subsidies and soft loans as an important demand driver for energy efficiency investments for small and medium sized companies while it is considerably less important for large companies (reflecting the materiality of energy costs to the business);
- The relative priority of energy efficiency among other investments is a key driver for large companies as well as the control of business interruption risks;
- Key decision makers confidence in energy efficiency resources is a much more significant issue for small and mid-sized companies than for larger companies;
- Binding energy efficiency targets have much greater impact as investment drivers on large companies than small or mid-sized companies;
- Corporate debt capacity and simple awareness of funding sources are key issues for small and mid-sized companies and not significant drivers for companies;
- The use of ISO 50001 and Energy Management Systems together with mandatory energy audits with summaries for key decision makers are strong drivers for all large companies<sup>83</sup> especially the energy intensive ones;
- Financial support for technical assistance is essential for small and mid-sized companies and much less for large companies;
- Large non-energy intensive companies are the only ones for which public recognition and image is a top ranked driver of demand for energy efficiency investments;

<sup>82</sup> Recognising that energy price and its volatility would be a higher driver for energy-intensive SMEs.

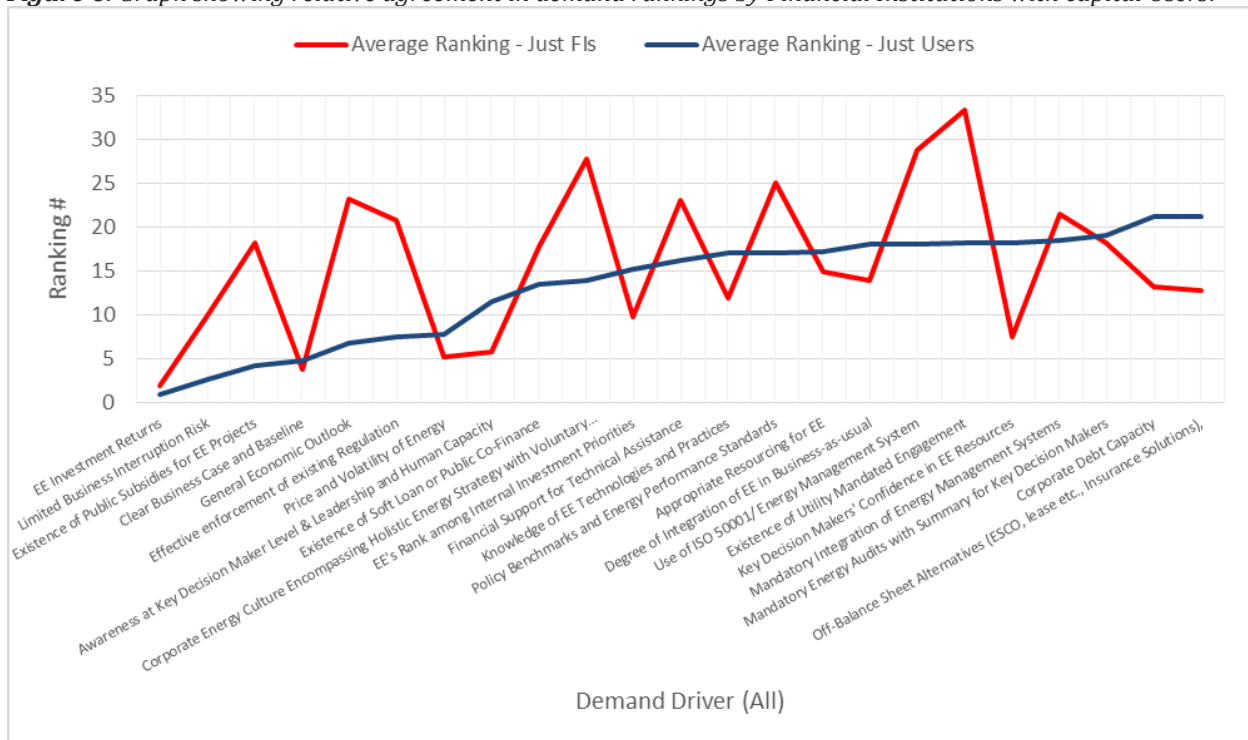
<sup>83</sup> When speaking of energy management systems, these promote technology investments but also operational improvements, e.g. more efficient routines. e.g. that we are analysing technology investments, not just energy conservation activities in industry and SMEs. Found in: Backlund, S., Ottonson, M., Palm, J., & Thollander, P. (2012). Extending the energy efficiency gap. *Journal of Energy Policy*, 51, 392.



- CO2 prices did not appear as a demand driver for energy efficiency investments as the group deemed their current impact on corporate decision making for energy efficiency as “insignificant”.

On the whole, Financial Institutions held fairly consensual views on the ranking of demand side drivers for energy efficiency investments with the overall EEFIG group, however there were points of divergence of opinion between Financial Institutions and those representing the user groups (Industry & SMEs) as illustrated in Figure 5:

**Figure 6:** Graph showing relative agreement in demand rankings by Financial Institutions with capital Users.



Interesting observations from the above analysis include:

- Financial Institutions tend to underestimate the importance of business interruption risks and the existence of subsidies to drive demand for energy efficiency in companies;
- Financial Institutions see the general economic outlook and effective enforcement of existing regulations as much less important drivers of energy efficiency than do the users;
- Finance users see key decision makers’ confidence in energy efficiency resources, awareness at key decision maker level & leadership and human capacity and the price and volatility of energy as stronger drivers than the financial institutions do;

Finally, but based upon a less representative sample, EEFIG felt that the demand drivers for companies in member states outside the core EU-15 countries varied quite materially from those in EU-15 countries with regulatory pressures ranking as a much higher driver in Member States outside the core EU-15. In addition, mandatory integration of energy management systems and decision makers’ confidence in member states outside the EU-15 were significantly stronger drivers than within EU-15 member states.



### 3.2.3. Analysis and Prioritisation of the Drivers of Supply of Corporate Energy Efficiency Investments

The EEFIG group discussed and identified 26 drivers affecting the supply of finance for corporate energy efficiency investments and through the same survey process group members weighted the importance of these supply drivers for each different segment of company<sup>84</sup>. Table 8 provides a summary of the results of this exercise (each driver is ranked 1-26 in terms of its survey score for each company segment; top ranks are coloured with darker blue) and the group's observations and analysis follows.

**Table 8:** EEFIG ranking of key drivers of supply of corporate energy efficiency investments by segment.

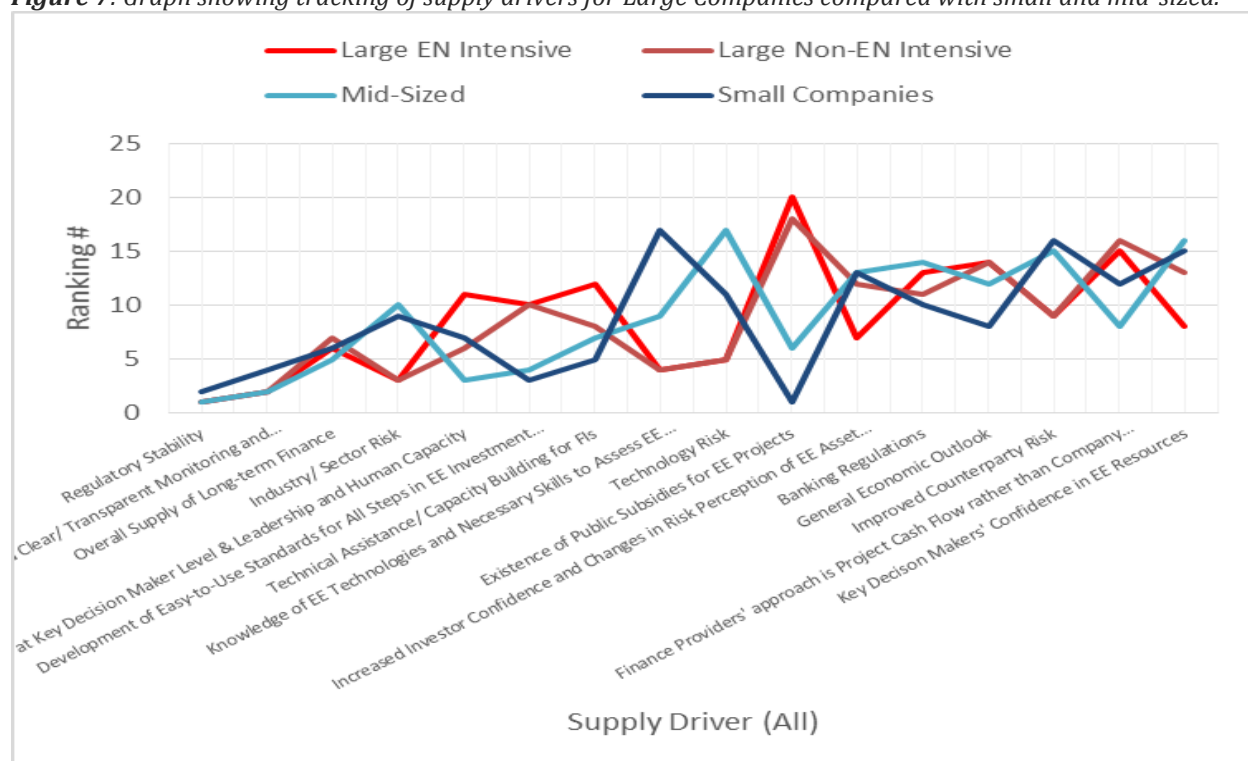
Company Segment	Large EN Intensive	Large Non-EN Intensive	Mid-Cap	SMEs	Average Rank
Regulatory Stability	1	1	1	2	1.25
Availability of Performance Data and Clear/ Transparent Monitoring and Measurement of Savings vs Baseline	2	2	2	4	2.5
Overall Supply of Long-term Finance	6	7	5	6	6
Industry/ Sector Risk	3	3	10	9	6.25
Awareness at Key Decision Maker Level & Leadership and Human Capacity	11	6	3	7	6.75
Development of Easy-to-Use Standards for All Steps in EE Investment Process	10	10	4	3	6.75
Technical Assistance/ Capacity Building for FIs	12	8	7	5	8
Knowledge of EE Technologies and Necessary Skills to Assess EE Investments	4	4	9	17	8.5
Technology Risk	5	5	17	11	9.5
Existence of Public Subsidies for EE Projects	20	18	6	1	11.25
Increased Investor Confidence and Changes in Risk Perception of EE Asset Class	7	12	13	13	11.25
Banking Regulations	13	11	14	10	12
General Economic Outlook	14	14	12	8	12
Improved Counterparty Risk	9	9	15	16	12.25
Finance Providers' approach is Project Cash Flow rather than Company Balance Sheet based	15	16	8	12	12.75
Key Decision Makers' Confidence in EE Resources	8	13	16	15	13
Increased Non-Bank Financing Options	18	19	11	14	15.5
Appropriate Resourcing for EE	17	17	18	18	17.5
Mainstreaming of EE Focus within Industrial Lending and Investment	16	15	19	20	17.5
Concentration Limits for Individual Lenders/ Availability of co-financing Options	21	20	22	22	21.25
Existence of Multiple Refinancing Options	19	21	23	23	21.5
Aggregation challenge and opportunity	24	24	20	19	21.75
Split Incentives	23	22	21	24	22.5
Reduced Hidden Costs of EE investments	22	23	25	25	23.75
Use of ESIF 2014-2020	25	25	24	21	23.75
Public-Private Funding to turn Research into Innovation	26	26	26	26	26

**Regulatory Stability is, again universally, the #1 driver of supply of energy efficiency investments across all corporate segments** irrespective of size, quickly followed by the availability of performance data with a clear & transparent monitoring and measurement system for energy savings vs a baseline and the overall supply of long-term finance. Then, from the fourth supply driver onwards the company segments begin to drive the rankings differently with large

<sup>84</sup> A full explanation of the EEFIG Relevant Driver Survey can be found in the Appendices.

companies (irrespective of energy intensity) and small and medium sized companies diverging in the relative rankings of their supply drivers as illustrated in Figure 6:

**Figure 7:** Graph showing tracking of supply drivers for Large Companies compared with small and mid-sized.



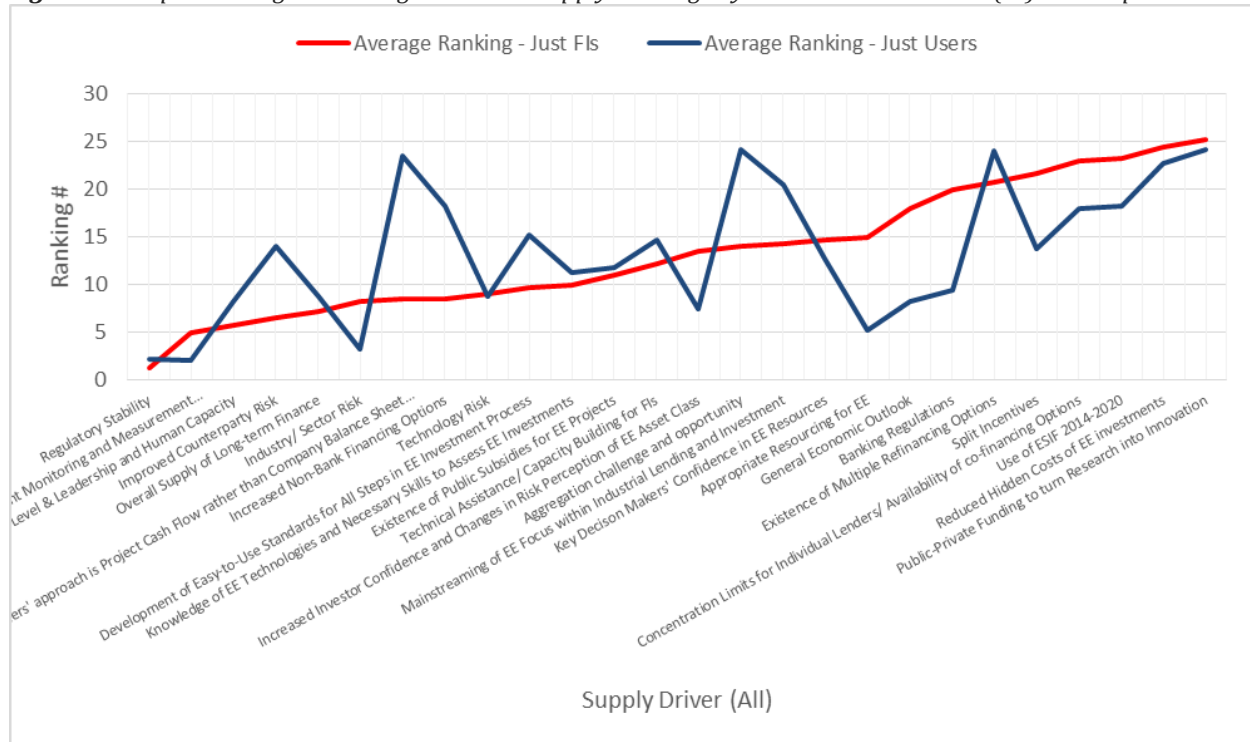
In addition, EEFIG members highlight the following key findings from their supply driver survey:

- Industrial or Sector risk is more important for large companies than for small and mid-sized companies;
- Development of easy-to-use standards for all steps in the energy efficiency investment process and the awareness at key decision maker level, leadership and human capacity is critical for small and medium sized companies but significantly less so for large firms;
- Knowledge of energy efficiency technologies, technology risks and the necessary skills to assess energy efficiency investments are considerably more important for large companies than they are for small and mid-sized companies;
- The existence of public incentives is a significant driver of supply of energy efficiency investments to small and mid-sized companies with its importance significantly less for large companies (except in Member States outside the EU-15).

Finally, it was again interesting to track where opinions diverged between the members of EEFIG representing financial institutions and those representing industry and SMEs. While figure 7 (supply side driver analysis) superficially appears similar to figure 5 (for the demand side), the deviations of opinion from Financial Institutions are more in-line with group expectations around where financial institutions traditionally differ in opinion on matters with their clients (eg. Credit risk perception). However, this analysis highlights the following points:

- Financial institutions see counterparty risk, the use of project cash-flows as opposed to corporate credit risk and also, but lower down the list, the aggregation challenge<sup>85</sup> as significantly higher priority drivers of the supply of energy efficiency investments than do their potential client users;
- For their part, industry and SME representatives to EEFIG rank appropriate resourcing for energy efficiency and general economic outlook as significantly higher priority drivers than do their counterparts representing Financial Institutions;

**Figure 8:** Graph showing relative agreement in supply rankings by Financial Institutions (FI) with capital Users.



<sup>85</sup> The process to identify, process and aggregate many thousands of similar energy efficiency investments into bundles discussed in greater detail in section 4.1 of this report.

### 3.2.4. EEFIG Combined Insights into the Drivers of Corporate Energy Efficiency Investments (Demand & Supply)

EEFIG's analysis and subsequent debate of the findings of its prioritisation exercise of the drivers of demand for and supply of corporate energy efficiency investments generated some key insights which are summarised here:

- **There is a considerable amount of EU corporate energy efficiency investment opportunity, but no “silver bullet”:** While there is a significant amount of corporate energy savings yet to be unlocked, stimulating greater volumes of corporate energy efficiency investments cannot be resolved with a single policy or instrument or by just one stakeholder group. Different approaches, instruments and solutions will be required for different corporate segments as differentiated initially by size, energy intensity and sector. However, EEFIG notes that some of the identified drivers for energy efficiency investments are in place in some sectors (mainly among large energy-intensive companies) and while overall supply of long-term finance is a high ranking supply barrier (especially for mid-caps and SMEs), financial institutions do not feel that availability of finance to large companies should prevent the financing of energy efficiency in those companies, but there is (in general) a need to raise the profile of energy efficiency investments and focus on the demand drivers for all company segments.
- **There is a clear “base-line” of cross-cutting drivers:** There are a clearly identifiable set of drivers which must be in-place across all company segments to create the necessary conditions for energy efficiency investments to flow in greater volume into industry and SMEs. These include: the awareness of energy efficiency at key decision maker level complemented by strong leadership and high quality human capacity offering a clear business case and baseline to deliver attractive risk-adjusted energy efficiency investment returns (demand side); and regulatory stability, a strong supply of long-term finance coupled with the availability of reliable energy efficiency performance data together with clear and transparent monitoring and measurement of savings against a baseline (supply side).
- **Specific Measures are required for Specific Segments:** In addition to the “base-line” of cross-cutting drivers there is a further set of segment-specific energy efficiency investment drivers that can be summarised by segment:
  - **Large Energy Intensive Companies:** The keys to unlock energy efficiency investment flows into large energy intensive companies seem to hinge around the increased use of energy audits with summaries for key decision makers at executive board level, energy management system implementation (including ISO 50001 processes) validated by clear benchmarking and energy performance standards. This strategic and programed approach should reduce business interruption risks and the increased energy efficiency investments will reduce the impacts of future energy price increases and volatility;
  - **Large Non-Energy Intensive Companies:** While the approaches required to unlock energy efficiency investments in large non-energy intensive companies are similar to large energy intensive companies, there is a clear need to improve the priority and visibility of energy efficiency with key decision makers. This can be achieved by developing an “energy culture” encompassing a holistic energy strategy with voluntary agreements and targets being driven by stakeholder pressure

(driving public recognition and image) and export potential to deliver competitiveness<sup>86</sup>;

- **Mid-cap Companies and SMEs:** The EEFIG survey results do not materially differ between mid-cap companies and SME drivers (except to note that the smaller the company the stronger the difference between its drivers and that of the large companies). The keys to drive energy efficiency investments in small and mid-sized companies are more related with the awareness and existence of public incentives, co-finance, soft-loans, tailored finance products and technical assistance for energy efficiency projects (including tax breaks), key decision makers' confidence in overall economic outlook, energy efficiency resources and the company's debt capacity.
- **Technology and R&D investment in energy efficiency is important to drive down implementation costs and deliver competitive industry pathways, but is not seen as a key blockage to growing energy efficiency investments in most companies:** EEFIG members believe that increasing the volume of energy efficiency investments is firstly about implementing existing technologies across a wider number of firms and with longer-term horizons as a strategic priority for decision makers (driving costs down through economies of scale), rather than a need to invest in R&D to develop new technologies. However, there is recognition that R&D is needed to reduce energy efficiency implementation costs and develop long-term transformational pathways for key globally competing industries (beyond the more immediate focus of this EEFIG survey).

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<sup>86</sup> Australian Government Department of Industry, ClimateWorks Australia & IIGC. (2014). "Energy Management and Company Competitiveness". Retrieved from: [http://www.igcc.org.au/Resources/Documents/climateworks\\_emcc\\_20141013.pdf](http://www.igcc.org.au/Resources/Documents/climateworks_emcc_20141013.pdf)



### 3.3. Approaches and Instruments to Stimulate Corporate Energy Efficiency Investments (with a focus on Industry & SMEs)

Having identified, assessed and prioritised the necessary drivers of energy efficiency investments, EEFIG members held a structured debate on the approaches and instruments through which these drivers can be addressed for companies.

EEFIG members made over fifty written submissions in the context of the survey and subsequent discussions which could further stimulate the market for corporate energy efficiency investments. EEFIG loosely sub-divided its discussions to drive energy efficiency investment into Policy-led Approaches (those depending upon policy leadership) and Market-led Approaches (those requiring leadership from market participants). EEFIG considers that both approaches must be developed in parallel with a high degree of interaction between them.

This chapter summarises this debate and in its conclusions links the key drivers of demand for and supply of energy efficiency investment with the relevant approaches and instruments described here.

#### 3.3.1. Policy-led Approaches to Drive Investment

Upon many occasions EEFIG members underlined that corporate energy efficiency investments occur more frequently in a corporate culture that has identified energy efficiency as a strategic priority and that those investments are delivered by a “supportive ecosystem” of drivers, approaches and instruments<sup>87</sup>. Although the heterogeneous nature of the corporate universe tends to limit “generic” approaches, EEFIG was able to identify the following Policy-led approaches to drive energy efficiency investments from its work:

- 1. Hybrid “Carrot and Stick” policies to Encourage Energy Efficiency focus at key points in the Corporate Investment Cycle:** Significant amounts of energy are used by machines and equipment which are core to the production cycle and whose replacement or upgrade relates more to useful life or other strategic factors than just energy efficiency. Policy makers in various countries<sup>88</sup> negotiate long-term agreements on energy efficiency with key industries and/ or offer a package of beneficial measures which support the choice of highly energy efficient machinery supported and incentivised with a green or energy tax of minor incidence or accelerated depreciation schemes<sup>89</sup> to motivate companies to prioritise energy efficiency during their natural replacement cycle. In addition, a wave of new generation of production technology is emerging which provides higher performance and productivity, improved cycle times, minimised waste, ICT integrated technologies for design and computer-based simulation of production and greater energy efficiency.
- 2. Policy-led initiatives to incentivise the integration of Energy Management Systems (EnMS) and creation of senior Energy Manager roles:** Article 8 of the European Union (EU) Energy Efficiency Directive (2012/27/EU) requires Member States to establish an energy audits regime under which all large (non-SME) enterprises conduct an audit by December 2015 and then once every four years. Having an integrated EnMS and senior

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<sup>87</sup> IEA & Institute for Industrial Productivity. (2012). *Pathways to Energy Management Programmes-Gaining through Saving* [PDF document]. Retrieved from: [http://www.iipnetwork.org/IEAIIIP\\_Energymanagement\\_reinaud.pdf](http://www.iipnetwork.org/IEAIIIP_Energymanagement_reinaud.pdf)

<sup>88</sup> Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved from: <http://iepd.iipnetwork.org/>

<sup>89</sup> Examples of Accelerated Depreciation from UK, NL and Ireland. See:

Irish Government - Department of Communications, Energy and Natural Resources & Sustainable Energy Authority of Ireland. (2014). *Review and Cost Benefit Analysis of the Accelerated Capital Allowances scheme for Energy Efficient Equipment*. Retrieved from: [http://www.seai.ie/Publications/Your\\_Business\\_Publications/Large\\_Energy\\_Users/Review-and-Cost-Benefit-Analysis-of-the-ACA-scheme-for-EE-Equipment.pdf](http://www.seai.ie/Publications/Your_Business_Publications/Large_Energy_Users/Review-and-Cost-Benefit-Analysis-of-the-ACA-scheme-for-EE-Equipment.pdf)



energy managers are critical to deliver high quality energy audits and implement their recommendations (although companies implementing ISO 50001 EnMS are exempt from mandatory audits). Tax deductions<sup>90</sup>, exemptions and soft loans are among the financial incentives seen in Germany, Sweden and Denmark<sup>91</sup> which are capable of driving the employment of energy managers and the installation of energy management systems using ISO 50001 in companies which consume large amounts of energy<sup>92</sup>. In addition, countries can make energy use more transparent through reporting standards to encourage energy savings and rank performance as other measures which lead to improved energy efficiency and drive investment.

**3. Open Source EU Corporate Energy Efficiency Benchmarking Databases:** EEFIG members suggested that greater availability of comparable, anonymised industrial process energy intensity and energy efficiency investment performance databases for production sectors is needed for EU companies to benchmark their energy efficiency performance (both in absolute terms and by individual investment) as have been developed in some industries and geographies<sup>93</sup>. Indices of energy efficiency in industry can further assist to evaluate the current stand of the industry regarding energy efficiency<sup>94</sup>. Potentially, ways can be found to connect the data gathered during energy audits to fill an open source EU corporate energy intensity benchmarking databases and with the findings from firms which install and use EnMS with public support. Such tools would then act as a direct resource to support newly incorporated Energy Managers into businesses, especially targeting SMEs. Aside from the databases themselves an outreach and engagement resource is critical to ensure that their output remains practical.

**4. Industry and Finance supported Energy Efficiency Sector Pathways:** Modelled around the long-term industrial energy efficiency agreements negotiated in Germany and Netherlands, EEFIG sees a natural expansion and growth of such processes to more Member States and sectors with financial institutional involvement and support. Long-term planning and engagement on sectoral energy trajectories (considering a technology balanced and investment life-cycle approach – eg. Germany, Netherlands, UK<sup>95</sup>) can be developed in conjunction with the above database and benchmarking resources and respective industrial working groups and associations supported by the energy service industry and financial institutions. This would contribute towards a greater level of “connectivity” between high-level EU and Member State targeting processes and individual corporate actions. In

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<sup>90</sup> In Germany, companies who apply for a refund as a result of the tax cap legislation (§ 10 StromStG (German Electricity Tax Act) or § 55 EnergieStG (German Energy Tax Act)) have to provide evidence of a certified EnMS according to DIN EN ISO 50001 or validation according to EMAS (Eco Management and Audit Scheme).

<sup>91</sup> Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved from: <http://iepd.iipnetwork.org/>

<sup>92</sup> Although EEFIG notes that the cost of ISO 50001 implementation in energy intense SMEs is proportionately reduced due to scale.

<sup>93</sup> Five key databases were identified:

US Department of Energy-Office of Energy Efficiency & Renewable Energy. (2014). *CHP Project Profiles Database*. [Website]. Retrieved from: <http://www.energy.gov/eere/amo/chp-deployment>;

Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved from: <http://iepd.iipnetwork.org/>;

WorldSteel Association. (2014). Workshops and Benchmarking: Worldsteel safety and technical workshop. [Website]. Retrieved from: <http://www.worldsteel.org/steel-by-topic/technology/workshops-and-benchmarking.html>;

Rutgers University. (2014). *Industrial Assessment Centers Database* [Website]. Retrieved from: <http://iac.rutgers.edu/database/>;

Linköping University – Department of Computer and Information Science. (2014). *DEFRAM – A database for facilitating better energy efficiency assessments and improvements*. [Website]. Retrieved from: <http://www.ida.liu.se/~evabl45/defram.en.shtml>

<sup>94</sup> Sauer, A. & Mandel, J (2013). *Der neue Energieeffizienz-Index – EEI: Entwicklung der Energieeffizienz in der Produzierenden Industrie*. In: Werkstattstechnik online Jahrgang 103. (2013). H. 5, p. 437-443

Kasprovicz, R. (2015). *Der Energieeffizienz-Index der deutschen Industrie, Fachzeitschrift Technik in Bayern*.

<sup>95</sup> Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved from: <http://iepd.iipnetwork.org/>

addition, Member States should consider measures for the uptake of energy efficient solutions as well as the clustering of generation and demand points. Based upon a comprehensive assessment for the potential for the application of high efficiency cogeneration and efficient district heating and cooling, national authorities can put in place carrot and stick for industrial sites greater than 20 MW thermal input. A number of member states have taken a more progressive stance on the matter support a more energy efficient decentralised and self-generation heat and power models.

- 5. Policy support for Longer-term Energy Efficiency Investment Horizons and Consideration of Multiple Benefits:** A recurrent issue discussed by EEFIG is the reluctance of many companies (large and small) to invest in energy efficiency measures with payback periods of over 3-4 years<sup>96</sup> – or move away from simple energy payback measures. While the overall investment climate is important to consider, it is critical to raise the awareness of and multiple benefits to energy efficiency procurement options for large and small companies. Accelerated depreciation schemes<sup>97</sup> for energy efficient purchases have been successful in Ireland (since 2008 now with a list of 10,500 energy efficient products), in the UK, Netherlands and other countries. In addition, and especially for SMEs and non-core processes, specialty finance facilities and insurance schemes<sup>98</sup> can be provided with a mix of public and private capital where potential roles of the public finance are to de-risk the asset package and extend the maturity of the finance offered for energy efficiency upgrades.
- 6. Project Development Assistance Facilities for SMEs:** EEFIG has identified the need to scale-up targeted capacity building and to build energy efficiency project development capacity for SMEs – which EEFIG notes does not necessarily have to be internal to each SME. Project Development support is a key component which can work alongside financial instruments where appropriate and should be linked to energy audits to ensure that the right technical capabilities can be applied to develop investable projects in the SME sector. EEFIG could see a need for project development assistance facilities, modelled on the successful SME energy efficiency investment programmes managed by public financial institutions such as EIB, KfW and EBRD, and others, directed to scale-up projects, develop benchmarks, reduce transaction costs, improve energy audits and their uptake and support the project development of energy efficiency investments in SMEs across Europe.

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<sup>96</sup> Institut der deutschen Wirtschaft Köln. (2013). *IW-Umweltexpertenpanel 2013: Umwelt- und Energiepolitik im Meinungsbild der Wirtschaft*. Retrieved from: <http://www.iwkoeln.de/en/studien/gutachten/beitrag/hendrik-biebeler-iw-umweltexpertenpanel-2013-144512>

<sup>97</sup> Examples of Accelerated Depreciation from UK, NL and Ireland. See: Irish Government - Department of Communications, Energy and Natural Resources & Sustainable Energy Authority of Ireland. (2014). *Review and Cost Benefit Analysis of the Accelerated Capital Allowances scheme for Energy Efficient Equipment*. Retrieved from: [http://www.seai.ie/Publications/Your\\_Business\\_Publications/Large\\_Energy\\_Users/Review-and-Cost-Benefit-Analysis-of-the-ACA-scheme-for-EE-Equipment.pdf](http://www.seai.ie/Publications/Your_Business_Publications/Large_Energy_Users/Review-and-Cost-Benefit-Analysis-of-the-ACA-scheme-for-EE-Equipment.pdf)

<sup>98</sup> Danish Energy Agency; Danish Ministry of Climate, Energy and Building; & Ministry of Foreign Affairs of Denmark. (2014). *Energy Savings Insurance: A Design*. Retrieved from: [http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/design\\_of\\_an\\_energy\\_savings\\_insurance\\_instrument\\_-\\_final\\_2.pdf](http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/design_of_an_energy_savings_insurance_instrument_-_final_2.pdf)

### 3.3.2. Market-led Approaches to Drive Investment

EEFIG identified the following market-led approaches:

- 1. Energy Efficiency Investment Approach and Procedures imbedded within “Standard” Corporate Finance:** Financial Institutions need to adopt the “best practice” model of mainstreaming energy efficiency<sup>99</sup> in three dimensions: ‘strategic mainstreaming’ meaning defining energy efficiency in key governing policies as ‘core’ business of the Financial Institution, having a dedicated in-house team of experts with technical and financial expertise to support banking origination, structuring and monitoring of investments and a so called ‘operational mainstreaming’ with investment targets and objectives set for client facing staff in each sector. This can also be supported by screening all existing and potential projects to identify opportunities for energy savings and providing free energy audits and energy management training to unlock savings potential for customers<sup>100</sup> or to follow examples as in Estonia (Kredex) where two steps of project development assistance are incorporated into the financial instrument before a soft loan is provided. Financial Institutions should work closely with technical specialists to help support the design and specification of energy audits, identify investable energy saving opportunities, select economically viable “finance ready” projects and develop a long-term investment programme for energy efficiency which can be presented to a company’s management and financial decision-makers to raise the priority of energy efficiency projects and ensure that viable projects are incorporated into the company’s long-term investment plan and financed fully or partially by the Financial Institution.
- 2. Promotion of Use of ISO 50001 and Energy Management Systems within large energy consumers supported by Financial Institutions:** There is evidence that standardised approaches to energy management (eg. ISO 50001) and the deployment of EnMS within large energy consumers is positively impacting the delivery of energy savings<sup>101</sup> from those companies. EEFIG references again the highly engaged work being undertaken by the Sustainable Energy Initiative at the EBRD to make energy audits, the integration of energy managers (up to executive board level) and deployment of EnMS as core to all corporate lending<sup>102</sup>.
- 3. Contribute to Energy Efficiency Performance Benchmarking Database:** The quality of baselines and data has been an underlying theme expressed by energy service companies and financial institutions as well as representatives from industry and SMEs. An “anonymised” benchmarking energy efficiency performance database covering manufacturing industries and industrial processes by sector as well as best practices among significant consumers will require the commitment and engagement from companies and their energy managers in the key sectors and energy consumers. To make this initiative useful, financial institutions and specialist investors should clarify what data and data

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<sup>99</sup> Initially, as energy efficiency investments are introduced to a sector, significant technical assistance and capacity building is needed to define and support ongoing investments. Over time, energy efficiency investments are identified and implemented in several projects as they become part of the regular business approach in that sector, often upstream at the initial client contact phase. For example, this has become the practice in the Agribusiness or in the Manufacturing and Services sectors where energy efficiency is presented upfront as part of the value proposition and offer at the EBRD.

<sup>100</sup> EBRD. (2015). *Improving Industrial Energy Efficiency*: Thematic factsheet. Retrieved from: <http://www.ebrd.com/downloads/research/factsheets/industriale.pdf>

<sup>101</sup> Thollander, P., Palm J. (2012). *“Improving energy efficiency in industrial energy systems: An interdisciplinary perspective on barriers, energy audits, energy management, policies & programs”*. London: Springer. Retrieved from: <http://serverlib.moe.gov.ir/documents/10157/42675/Improving+Energy+Efficiency+in+Industrial+Energy+Systems.pdf>

Institute for Industrial Productivity. (2013). *Large-scale adoption of energy management systems: global energy efficiency programme insights*. Retrieved from: [http://www.iipnetwork.org/EnMS\\_10pager\\_memo.pdf](http://www.iipnetwork.org/EnMS_10pager_memo.pdf)

<sup>102</sup> EBRD Sustainable Energy Initiative. (2014). *Developing Corporate Energy Efficiency: Managing Resources to Boost Productivity*. Retrieved from: <http://www.ebrd.com/downloads/sector/eccc/managing-resources.pdf>

architecture they will require and then work directly with EU policy-makers to determine how this is achieved – e.g. agreeing on specific data points to be uniformly collected and reported during energy audits and EnMS certification processes – please refer to five international databases and the indices identified in footnote to section 3.3.1.

- 4. Raise Energy Efficiency as a Strategic Priority at Executive Board level and Link to Key Points in the Corporate Investment Cycle:** EEFIG members agree with the body of research suggesting that energy efficiency needs to be considered as more “strategic” and be raised at Executive Board level. The presentation at executive board level of energy efficiency investments resulting from implementation of EnMS, and those identified by energy managers, is critical and delivers a competitive edge<sup>103</sup> as well as energy savings. Financial Institutions can work with their large energy consuming clients (as illustrated by EBRD) to support the raising of energy efficiency within the financial directorate of their clients.

### **3.3.3. Financial Instruments for Corporate Energy Efficiency Investing**

A wide array of new and existing financial instruments and case studies were presented, discussed and assessed during EEFIG’s work. In total, participants identified 13 different financial instruments for energy efficiency investing in companies of which 6 instruments are considered “mature” and are widely used to fund energy efficiency investments directly or indirectly, and 7 other “emerging” instruments are newer but have potential to increase corporate energy efficiency investing in the EU.

EEFIG’s more detailed thinking and analysis of these financial instruments (with a full definition, strengths, weaknesses and best practice examples of each) is included in full in the Appendices of this report (Section 5.3). However, the following highlights can be drawn from EEFIG’s financial instrument survey, working group and discussions:

- **There are a wealth of mature financial instruments which are used by all sizes of company to finance energy efficiency investments:** All EEFIG’s survey responders identified mature financial instruments, except covered bonds (which are a refinancing instrument requiring large existing portfolios of energy efficiency investments as collateral) play a useful role in current corporate energy efficiency investing;
- **Energy performance contracting is a widespread and adaptable instrument:** While slightly better used by larger companies, Energy Performance Contracts clearly have widespread application in funding corporate energy efficiency investments. The growth of Energy Performance Contract usage for corporate energy efficiency investments can be accelerated through the clarification of their accounting treatments for hosts and their regulatory treatment for banks and insurance companies (see further analysis in Section 4). In addition, the emergence of new insurance products, portfolio refinancing alternatives, contracting and procurement standards, reduction of transaction costs and greater trust from project hosts will support Energy Performance Contracts’ growth;
- **Dedicated credit lines have wide application particularly for SMEs:** Dedicated credit lines are among the best used financial instruments to fund corporate energy efficiency investments and they are a leading tool used to unlock energy efficiency investments in SMEs. Led by public financial institutions, a significant track record of successful corporate

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<sup>103</sup> In a survey of Australian EEO Program participants, 94% agreed that it was important to keep board members informed of progress on energy efficiency measures.

OgilvyEarth. (2010). *Quantitative Research of CEOs/Senior Level Executives Participating in the Energy Efficiency Opportunities Program*. Retrieved from: <http://eex.gov.au/files/2012/01/Ogilvy-Earth-CEO-Report.pdf>

energy efficiency lending has been built-up which can be grown through the expansion of the networks of private on-lending bank partners, stability of funding, increasingly simplified and standardised applications procedures and a comprehensive network of energy auditors and independent experts to support them;

- **Risk-sharing facilities and subordinated loans can enhance public-private finance leverage and help transition markets:** As energy efficiency markets mature there is a significant opportunity to use risk sharing facilities and subordinated loans in place of grants and to involve greater numbers of financial institutions and amounts of finance. Both risk-sharing facilities and subordinated loans offer to de-risk transactions, removing uncertainties around energy efficiency asset performance and providing the opportunity to lower financing costs and extend maturities to support holistic and long-term corporate energy efficiency investments. Both risk-sharing facilities and subordinated loans are transition instruments used to address market failures and (while paying attention to moral hazard) encourage the migration from grant-based systems to a blended approach with greater private sector involvement;
- **Leasing can support the incorporation and uptake of highly energy efficient equipment purchases for companies:** As a widely used alternative for the financing of machinery, equipment and vehicles, leases offer a window into the natural replacement cycle of a company's assets. An off-balance sheet treatment of leases and the wrapping of the interest, capital and often service payments into one makes them simple and capital efficient for companies to manage. Policy programmes providing additional fiscal or accelerated depreciation support the selection of highly energy efficiency equipment (such as that used in Ireland, and other countries) can be combined in the context of a lease to improve the energy efficiency performance of equipment renewal and deliver more benefits to the corporate host;
- **Energy efficiency funds and Energy service agreements show strong potential to finance more corporate energy efficiency:** Energy efficiency funds and energy service agreements are financial instruments with good prospects to grow energy efficiency investing among companies of all sizes. Energy efficiency funds are attractive to SRI investors as they provide clear visibility to energy efficiency investments and their performance and their growth can be linked to the rise of Energy Performance Contract usage and the resolution of the market penetration, standardisation and similar issues. Energy service agreements benefit from the support of strong traditional energy actors and can help companies who do not have dedicated energy managers potentially out-source to experts the tasks of managing the complexity of energy procurement while lowering the cost;
- **Green bonds have strong potential to support large corporate investments in energy efficiency:** The market for green bonds more than tripled in 2014 to \$35 billion and has provided some of the world's leading bond issuers the opportunity to fund their "green" activity. The more precise the definition of "green" is and the greater the number of issuers, the stronger the knock-on impact will be on energy efficiency investing within companies as if assets must be considered highly energy efficient (or best in class) to receive green bond proceeds this will spur energy efficiency investments;
- **A factoring fund for energy performance contracts may alleviate the balance sheets of small Energy Performance Contract providers to companies:** EEFIG participants see a cross sectoral potential for a factoring fund for Energy Performance Contracts which can purchase the "mature" Energy Performance Contracts (which have already been held for some years to de-risk them) from smaller Energy Performance Contract providers in order so that they can free up limited balance sheet resources to originate more Energy Performance Contracts and build upon their experience. While factoring for Energy





Performance Contracts is a relatively new and untested concept the factor finance mechanism is well known to companies and may provide additional capacity among Energy Performance Contract providers to grow their business and thereby increase their amount of energy efficiency investing;

- **On-bill repayment and on-tax financing potentially have a role for SMEs:** To the extent that companies are looking to fund the energy efficient renovation of their commercial or industrial buildings, on-bill financing instruments (utility and tax bill) will be of interest as they enhance the seniority of repayments, resolve spilt incentives and provide a track record of repayment which may be attractive to SMEs with lower credit ratings than the expectations of cash-flows from specific assets. For general corporate energy efficiency investments the opportunity for on-bill is reduced especially for larger companies whose credit ratings are likely to be better and whose financial operation are more sophisticated and complex;

EEFIG’s assessment of the likely impact of each of its 13 identified financial instruments on corporate energy efficiency investments was crystalized through a survey (whose results are in Table 10) where participants were asked to rate each financial instrument on its applicability to support the energy efficiency investment flow in each market segment using the following scores:

- Score 0 if instrument is "not applicable" (Mature) or has “zero potential” (Emerging)
- Score 1 if instrument is "marginally useful" (Mature) or has “some potential” (Emerging)
- Score 2 if instrument is "useful" (Mature) or has “potential” (Emerging)
- Score 3 if instrument is "very useful" (Mature) or has “strong potential” (Emerging)

**Table 10:** Results of the EEFIG survey on Financial Instruments for corporate energy efficiency investments

<u>Mature Financial Instruments</u>	Large Energy Intensive	Large Non-Energy Intensive	Mid-Cap	SMEs
Energy Performance Contracting (Undertaken by Private Sector)	3	3	3	2
Dedicated Credit Lines	2	2	3	3
Risk-Sharing Facilities	2	2	2	2
Subordinated Loan	2	2	2	2
Leasing	2	2	2	2
Covered Bonds	1	1	1	0

<u>Emerging Financial Instruments</u>	Large Energy Intensive	Large Non-Energy Intensive	Mid-Cap	SMEs
Energy Efficiency Investment Funds	3	3	2	2
Energy Services Agreement	2	2	2	2
Factoring Fund for Energy Performance Contracts	2	2	2	2
Green Bonds	3	2	2	1
On-Bill Repayment	1	1	1	2
On-Tax Finance (PACE)	1	1	1	1



### 3.4. Connecting the Key Drivers with Specific Approaches

EEFIG members discussed and were able to connect some of the markets and policy-led approaches and the instruments identified in this chapter to some of the priority drivers of demand and supply of energy efficiency investments discussed in section 3B. This analysis, shown in the following tables, provides the building blocks to develop a practical framework to stimulate energy efficiency investments in industry & SMEs:

**Table 11:** Key drivers for demand for energy efficiency investments, selected approaches and instruments

Demand Drivers	Approaches and/or Instruments Proposed		
<b>Applicable to All Companies</b> (Note: Key = "M" Markets-led; "P" Policy-led)			
<b>IMPERFECT INFO</b>	<b>Clear Business Case and Baseline</b>	<ul style="list-style-type: none"> <li>Development of guidelines for energy efficiency opportunity report connecting to energy audits with internal stakeholder buy-in, "finance ready" and fitting the template used by the Executive Management board.</li> </ul>	M
		<ul style="list-style-type: none"> <li>Anonymised data base of energy intensity (especially for SMEs) in order for industries to be able to benchmark themselves, following the example of five identified international databases.</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>Improved Measurement and Verification Standards for Energy Savings</li> </ul>	M
		<ul style="list-style-type: none"> <li>More case studies and best practice circulated among company segments and Member States</li> </ul>	M
<b>RISK</b>	<b>Energy Efficiency Investment Returns</b>	<ul style="list-style-type: none"> <li>Combine low and high hanging fruits in order to avoid lock-in effect. Implementation of a holistic long-term investment programme needs to be presented by a third party entity capable to deliver it.</li> </ul>	M
		<ul style="list-style-type: none"> <li>Recognising the multiple energy and non-energy benefits of energy efficiency</li> </ul>	M
		<ul style="list-style-type: none"> <li>Use NPV and life-cycle costs to take into account long-term savings instead of simple pay-backs</li> </ul>	M
		<ul style="list-style-type: none"> <li>Increasing sanctions/ taxes on energy (eg. Carbon tax) and especially dis-incentivising wasting energy</li> </ul>	P
		<ul style="list-style-type: none"> <li>Marginal tax breaks and/ or accounting benefits for the use of EnMS, Energy Manager costs or say the application of specific technologies in selected industrial processes</li> </ul>	P
<b>BOUNDED RATIONALITY</b>	<b>Appropriate Resourcing for Energy Efficiency</b>	<ul style="list-style-type: none"> <li>Recognition that policy makers should target the delivery of an enabling framework (meaning energy management culture, EnMS, energy managers, energy audits, multiple benefits of EE) for energy efficiency investments</li> </ul>	P
		<ul style="list-style-type: none"> <li>Increased focus on training and process improvements in the energy efficiency project development stage</li> </ul>	M
		<ul style="list-style-type: none"> <li>Training and quality certification processes for energy auditors in order to high quality deliver energy audits that can be used by financiers</li> </ul>	M/P
		<ul style="list-style-type: none"> <li>Packaged solutions to facilitate EE investing for Financial Institutions, cut-down transaction costs &amp; legislative barriers</li> </ul>	P

	<b>Awareness at Key Decision Maker Level &amp; Leadership and Human Capacity</b>	<ul style="list-style-type: none"> <li>Improve Energy Audit so that it is more “executive” and delivers more into a key-decision maker/ executive board level context</li> </ul>	M
		<ul style="list-style-type: none"> <li>Focus on policies (eg. Small tax breaks or accelerated depreciation allowances) which can raise awareness of energy efficiency at key decision maker level (and CFO)</li> </ul>	P
	<b>Use of ISO 50001/ Energy Management System</b>	<ul style="list-style-type: none"> <li>Show the value a structured framework for demand side energy management can have for all users</li> </ul>	M
<b>REGULATORY</b>	<b>Binding Energy Efficiency Targets</b>	<ul style="list-style-type: none"> <li>Higher degree of “connectivity” to translate binding energy efficiency targets into actions at MS level through best practice negotiated sector energy efficiency agreements (“extending the EED roadmap process to companies”)</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>Getting the balance right between voluntary and regulatory driven mechanisms: Hybrid “carrot &amp; stick” approaches</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>Balance new “regulatory requirements” with public support programmes to smooth their impact and acceptance</li> </ul>	P
		<ul style="list-style-type: none"> <li>Support of the energy efficiency and energy intensity processes (eg. Eco-Design) for production process equipment</li> </ul>	P
	<b>Effective enforcement of existing Regulation</b>	<ul style="list-style-type: none"> <li>Greater resourcing at MS level to support and police existing legislation</li> </ul>	P
		<ul style="list-style-type: none"> <li>Greater focus on “regulatory standards” and benchmarking</li> </ul>	P
<b>Mandatory Integration of Energy Management Systems</b>	<ul style="list-style-type: none"> <li>Policies to support dedicated Energy Managers and EnMS as they are a key tool for companies to integrated energy efficiency into their processes, increase visibility and raise priority</li> </ul>	P	
<b>ACCESS TO CAPITAL</b>	<b>Off-Balance Sheet Alternatives (ESCO, lease, Insurance Solutions etc.)</b>	<ul style="list-style-type: none"> <li>Ensure that accounting treatment deals with energy efficiency investments as assets whose value are reflected and then depreciated over useful life (ie those which generate the energy savings) as opposed to one-time costs.</li> </ul>	P/M
<b>Applicable Mainly to Large Companies</b>			
<b>BOUNDED RATIONALITY</b>	<b>Appropriate Resourcing for Energy Efficiency</b>	<ul style="list-style-type: none"> <li>Identify “tool-kits” to connect and replicate Energy Efficiency measures internally among the individual plants within a corporate group</li> </ul>	M
		<ul style="list-style-type: none"> <li>Methods to increase the pressure from large buyers to encourage supply chain energy savings</li> </ul>	M
	<b>Use of ISO 50001/ Energy Management System</b>	<ul style="list-style-type: none"> <li>Mandate the use of Energy Management Systems in key Industries</li> </ul>	P
		<ul style="list-style-type: none"> <li>Greater engagement in industrial verticals using benchmarks eg. IIP Industrial Efficiency Technology Database approach for cement and pulp and paper industries<sup>104</sup></li> </ul>	M

<sup>104</sup> Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database: Pulp and Paper*. [Website]. Retrieved from: <http://ietd.iipnetwork.org/content/pulp-and-paper#benchmarks>

		<ul style="list-style-type: none"> <li>Tax breaks for the use of EMS, Energy Manager costs or say the application of specific technologies in selected industrial processes</li> </ul>	P
REGULATORY	Mandatory Integration of Energy Management Systems	<ul style="list-style-type: none"> <li>Energy Management Systems are a key tool for large companies to integrate energy efficiency into its processes, increase visibility and raise priority</li> </ul>	M
		<ul style="list-style-type: none"> <li>Like Germany, offering a rebate on a new energy tax (or green/ carbon tax) to companies above a certain energy spend who integrate EnMS into their management systems</li> </ul>	P
	Mandatory Energy Audits with Summary for Key Decision Makers	<ul style="list-style-type: none"> <li>Energy audits should be (mandatorily) presented at board-level based upon guidelines as to what needs to be assessed and included in that board-report</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>Obligation to implement measures from energy audits mandatory "when economically feasible" (with incentives)</li> </ul>	P
		<ul style="list-style-type: none"> <li>Obligation to disclose the potential impact of the energy audits carried out, possibly on an annual basis</li> </ul>	P
		<ul style="list-style-type: none"> <li>Ensure that energy audits lead to investments (especially if funded by ESCO). An example is a development agreement with an ESCO giving exclusivity to execute measures which are "economical" (as defined in advance) and with a break-fee if company decides not to proceed or to do without input from ESCO</li> </ul>	M
IMPERFECT INFO	Clear Business Case and Baseline	<ul style="list-style-type: none"> <li>Strong utilisation of energy efficiency benchmarks described for various key energy intensive processes by the Institute for Industrial Productivity according to its Industrial Energy Technology Database<sup>105</sup> and the creation of EU versions of other useful US energy efficiency benchmark tools to save up to 26% of energy use across industrial sectors by 2030</li> </ul>	P/M
HIDDEN COSTS	Key Decision Makers' Confidence in EE Resources	<ul style="list-style-type: none"> <li>Improve standards and qualities for the lead contractor role to review and present scale solutions for multi-site energy efficiency investments.</li> </ul>	M
<b>Applicable Mainly to SMEs</b>			
BOUNDED RATIONALITY	Appropriate Resourcing for Energy Efficiency	<ul style="list-style-type: none"> <li>Expert utility energy manager resources are enabled for companies through US-style mandatory engagement for utilities to support their clients investing in energy efficiency (where no alternative arrangements exist).</li> <li>Financial Institutions more pro-actively develop energy efficiency investments for their corporate clients.</li> </ul>	P/M
	Awareness at Key Decision Maker Level & Leadership and Human Capacity	<ul style="list-style-type: none"> <li>Increased capacity building and sharing of best practice for SMEs (e.g. through Enterprise Europe Network)</li> </ul>	P/M
	Awareness of	<ul style="list-style-type: none"> <li>Sustained and consistent training assistance programmes</li> </ul>	P/M

<sup>105</sup> Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved from: <http://iepd.iipnetwork.org/>

	<b>Funding Sources/ Tailored Financial Products</b>	targeting SMEs with high savings potential with attached funding packages to make measures easier to execute	
<b>ACCESS TO FINANCE</b>	<b>Financial Support for Project Development Assistance (PDA)</b>	<ul style="list-style-type: none"> <li>Support design of simple benchmarks and tool-kits for frequently used technologies for SMEs (eg. LEMEs).</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>PDA offered to project promoters in strategic sectors, or against technology pathways, to develop investment ready projects.</li> </ul>	P/M

**Table 12: Key drivers of supply for energy efficiency investments and selected approaches and instruments**

Supply Drivers		Instruments and Approaches Proposed	
<b>Applicable to All Companies</b> (Note: Key = "M" Markets-led; "P" Policy-led)			
<b>BOUNDED RATIONALITY</b>	<b>Awareness at Key Decision Maker Level &amp; Leadership and Human Capacity</b>	<ul style="list-style-type: none"> <li>Require board-level sign-off for access to public-private finance mechanisms</li> </ul>	P/M
	<b>Development of Easy-to-Use Standards for All Steps in EE Investment Process</b>	<ul style="list-style-type: none"> <li>Develop standards for each step of the corporate energy efficiency investment process using guidelines from example work such as Institute for Industrial Productivity and Investor Confidence Project</li> </ul>	M
		<ul style="list-style-type: none"> <li>Training and quality processes for energy auditors should be focused to deliver quality audits that can be used by financiers</li> </ul>	M
<b>IMPERFECT INFO</b>	<b>Availability of Performance Data and Clear/ Transparent Monitoring and Measurement of Savings vs Baseline</b>	<ul style="list-style-type: none"> <li>Focus on the informational needs of third party Energy Performance Contract providers to reduce transaction costs and reduce wasted time in quoting for energy efficiency investment work</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>Build case-history of Energy Performance Contract operation for company hosts and third party Energy Performance Contract providers to develop easy to use standard schemes and improve understanding</li> </ul>	M
	<b>Knowledge of EE Technologies and Necessary Skills to Assess EE Investments</b>	<ul style="list-style-type: none"> <li>Energy audits and EnMS should produce a business summary which can be pre presented at board-level with finance terms; which should be a requirement for any public finance supported energy audit or EnMS implementation</li> </ul>	M
<ul style="list-style-type: none"> <li>Trust in EE investment processes and Energy Performance Contract providers obligations can be improved (using standards, with transparent feedback etc.) and this will improve finance terms</li> </ul>		M	
<b>RISK</b>	<b>Finance Providers' approach based on Project Cash Flow rather than Company</b>	<ul style="list-style-type: none"> <li>Review and improve internal approval processes within Financial Institutions for energy efficiency investments in corporate clients or as a part of general lending</li> </ul>	M
		<ul style="list-style-type: none"> <li>Ensure that projects are evaluated using a set of criteria (such as discounted cash flow, NPVs and IRRs) and not just</li> </ul>	M

	<b>Balance Sheet based</b>	project payback periods.	
	<b>Improved Counterparty Risk</b>	<ul style="list-style-type: none"> <li>Allocate risks to entities most able to manage them – e.g. ESCO, banks, loan, fund manager, energy manager.</li> </ul>	M
ACCESS TO CAPITAL	<b>Existence of Public Incentives for EE Projects</b>	<ul style="list-style-type: none"> <li>Design public support (direct or indirect) which re-cycles fiscal revenues back to firms to invest in additional energy efficiency measures (eg. UK CRC Energy Efficiency Programme prior to its adjustment<sup>106</sup>)</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>Clear legal framework for third party investors &amp; ESCOs including ensuring that public support schemes (eg. Reduced VAT rates and fiscal deductions) are not invalidated if EE measurers are implemented by an Energy Performance Contract provider</li> </ul>	P
	<b>Increased Non-Bank Finance Options</b>	<ul style="list-style-type: none"> <li>Develop and expand the roles of National Energy Efficiency Funds (Art. 20 of Energy Efficiency Directive) to offer tailored programmes for different segments of corporates</li> </ul>	p
		<ul style="list-style-type: none"> <li>Stimulate greater launch of dedicated energy efficiency finance funds and other specialised entities targeted at this space</li> </ul>	M/P
		<ul style="list-style-type: none"> <li>Develop and direct public and private finance mechanisms into “One-stop shops” distributed through Financial Institutions or other relevant entities and other engagement networks with companies</li> </ul>	P/M
		<ul style="list-style-type: none"> <li>More insurance products to guarantee energy savings for Energy Performance Contract providers</li> </ul>	M
	<b>Increased Investor Confidence and Changes in Risk Perception of EE Asset Class</b>	<ul style="list-style-type: none"> <li>Greater data transparency and availability via new benchmark databases and open source online tools</li> </ul>	P/M
	<b>Overall Supply of Long-term Finance</b>	<ul style="list-style-type: none"> <li>Regulatory mechanisms which support the greater supply of long-term finance for companies investing in energy efficiency to encourage development of projects with longer paybacks.</li> </ul>	P/M
	<b>Financial Support for Project Development Assistance</b>	<ul style="list-style-type: none"> <li>The PDA offered to project promoters capable of developing “investment ready” projects. It could be also channelled by the Financial Institutions, where appropriate and justified, to ensure “packaging” of services, but it should be independent from the source of funding of the investment.</li> </ul>	P/M
	<b>Applicable Mainly to Large Companies</b>		
IM PE	<b>Appropriate</b>	<ul style="list-style-type: none"> <li>Ensure that energy audits lead to investments. An example is a development agreement with an ESCO giving exclusivity to</li> </ul>	

<sup>106</sup> Full Explanation of UK CRC Energy Efficiency policy found below:

UK Government. (2015). *Policy: Reducing demand for energy from industry, businesses and the public sector*. [Website]. Retrieved from: <https://www.gov.uk/government/policies/reducing-demand-for-energy-from-industry-businesses-and-the-public-sector--2/supporting-pages/crc-energy-efficiency-scheme>

	<b>Resourcing for EE</b>	execute measures which are “economical” (as defined in advance) and with a break-fee if company decides not to proceed or to do without input from ESCO	M
<b>ACCESS TO FINANCE</b>	<b>Overall Supply of Long-term Finance</b>	<ul style="list-style-type: none"> <li>Identify mechanisms to include energy efficiency in long-term finance arrangements to ensure that precedence is given to energy efficiency investments (or that they are included)</li> </ul>	M
	<b>Increased Non-Bank Finance Options</b>	<ul style="list-style-type: none"> <li>Develop off-balance sheet investment mechanisms for EE in support processes (vs production processes), where much of the energy efficiency opportunities are. Large firms are often reluctant to have off-balance sheet investments on its core production processes but would have less of an issue on support processes, e.g. the delivery of commodities (heat, power...)</li> </ul>	M
<b>Applicable Mainly to SMEs</b>			
<b>ACCESS FINANCE</b>	<b>Existence of Multiple Finance Options</b>	<ul style="list-style-type: none"> <li>Support Capacity Building facilities attached to tailored financing alternatives (private or public or mixed)</li> </ul>	M/P



### 3.5. EEFIG's Conclusions for the Corporate Energy Efficiency Sector

EEFIG concludes its assessment of the drivers of corporate energy efficiency investments and the approaches and instruments required to stimulate them with the sense that while Europe leads in having de-coupled production from energy consumption, there remains a considerable amount of profitable energy efficiency investment that remains to be done. To engage with this potential, EEFIG considers that policy makers can work together with markets participants and financial institutions to develop and build upon the considerable efforts already underway to accelerate energy efficiency investment rates and benefit Europe's competitiveness and economy.

#### 3.5.1. What are the most imminent challenges to overcome?

Emerging from EEFIG's interim analysis are several key themes which guide its recommendations as outlined in the final section of this chapter. These are:

- 1. Increasing the Visibility and Priority of Corporate Energy Efficiency Investments:** Most corporate energy efficiency investing takes place as a part of the "normal" production investment cycles and is often invisible as it is funded internally and just one component of larger investments<sup>107</sup>. EEFIG considers that if energy efficiency investing, its multiple benefits and competitive value were raised at executive board level and given greater internal visibility for key decision makers within companies then this increased transparency would increase the amount of energy efficiency investments that are made.
- 2. Showcasing the value of Energy Management Systems (EnMS), ISO 50001 and the role of energy managers:** Greater resources could be invested in showcasing the value added to companies of all sizes and in all sectors of energy management systems, ISO 50001<sup>108</sup> and the role of energy managers to incentivise a more value-driving resource allocation in companies where significant and profitable energy efficiency investments exist but that do not have the technical expertise or adequate resourcing structures to take advantage of them or even include energy efficient upgrades within their natural investment cycles.
- 3. Corporate Energy Efficiency Investment programmes should be more holistic and have a longer term and more strategic vision:** EEFIG finds that the bulk of corporate energy efficiency investments are made with short pay-backs (2-4 years at most) and that significant further investment opportunities exist<sup>109</sup>. Many reasons have been put forward to explain the current trends including the overall EU industrial investment context, access to investment capital, need to improve quality and visibility of energy audits and the visibility and priority of energy efficiency investments. While these hurdles remain, EEFIG considers that the adequate resourcing for energy management, the increased transparency and benchmarking and the facilitation roles of major industry associations (as well as EU ASE, ECEEE, Chambers of Industry, IIP, IEA, WBCSD, EEIP etc) can play an important role here pro-actively supported by the voice of EU financial institutions.
- 4. Fiscal, Regulatory and Accounting treatment of Energy Efficiency Investments can improve:** EEFIG participants note that there are regulatory and accounting barriers which are preventing greater long-term corporate energy efficiency investing especially for energy performance contracts and their providers. In addition, some EU Member States provide

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<sup>107</sup> According to EEP's 3<sup>rd</sup> Energy Efficiency Index of the German Industry two thirds of the surveyed companies achieve energy efficiency improvements as side effects of other investments.

<sup>108</sup> Companies participating in the above index with a certified EnMS were 10 percentage points more successful in achieving their self-set energy efficiency targets than companies without.

<sup>109</sup> Bauernhansl, T., Kasproicz, R. & Stender, R. (2014). High Income Return and Safe Investments through Financing of Energy Efficient Measures in the Industry. *International Symposium on Green Manufacturing and Applications (ISGMA 2014)*, pp. 152-159. Retrieved from: [http://2014.isgma.org/data/ISGMA2014\\_proceedings\\_Web\\_v\\_F.pdf](http://2014.isgma.org/data/ISGMA2014_proceedings_Web_v_F.pdf)

fiscal and/ or accelerated depreciation advantages to the purchase of highly energy efficient assets. The resolution of the reporting barriers and improvement of the tax and accounting treatment of energy efficiency investments will clearly increase their flow.

5. **Increased development and use of standards for energy efficiency investments and their documentation is needed for up-scaling, aggregation and facilitation of capital market refinancing:** The standardisation and adoption of sectoral or industry best practices and the development of standard models for: Legal contracts, underwriting processes, procurement procedures, adjudication, measurement, verification, reporting, energy audits and energy savings insurance products will add volume to the energy efficiency investment market and lower its costs of finance and transaction costs. Work on the development of standard approaches<sup>110</sup> to develop energy efficiency baselines for different industries, certification schemes for energy auditors, the use of standardised Measurement, Reporting and Verification and legal documentation for Energy Performance Contract providers are particularly important to facilitate the bundling of investments for eventual recycling to the bond market or Green bond finance. This also would mutually reinforce Article 8 of the EED and the process of data collation and support the creation of “anonymised” benchmarks for different sectors and experience hubs.
6. **The limited availability and use of EU benchmarking data to support key decision makers in specific industries can be addressed:** EEFIG participants identified a non-exhaustive list of five key benchmarking databases which focus on selected sectors in selected geographies<sup>111</sup> and an index based approach<sup>112</sup>. Participants believe that the processes involved in the engagement and mining of relevant data in specific EU sectors and the engagement by researchers and corporate decision makers in the building, out-reach for and use of energy intensity and energy efficiency investment performance databases in Europe would encourage greater energy efficiency investment flow.
7. **Tailored resources are needed to address the energy efficiency opportunities in SMEs:** The heterogeneous and disaggregated nature of SMEs and their limited management time and attention for energy efficiency investments can be addressed through the use and promotion of specific energy efficiency financial instruments by Financial Institutions<sup>113</sup> and other relevant entities working in conjunction with private distribution partners and certified energy auditors. To be effective, the development of investment pipelines needs to

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<sup>110</sup> Such as a general standard on how to categorize energy end-use data for industry as this is key to be able to build relevant benchmarking indexes and in order to compare energy efficiency levels between countries and companies.

<sup>111</sup> Five key databases were identified, please see below:

US Department of Energy-Office of Energy Efficiency & Renewable Energy. (2014). *CHP Project Profiles Database*. [Website]. Retrieved from: <http://www.energy.gov/eere/amo/chp-deployment>

Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved: <http://iepd.iipnetwork.org/>

WorldSteel Association. (2014). Workshops and Benchmarking: Worldsteel safety and technical workshop. [Website]. Retrieved from: <http://www.worldsteel.org/steel-by-topic/technology/workshops-and-benchmarking.html>

Rutgers University. (2014). *Industrial Assessment Centers Database* [Website]. Retrieved from: <http://iac.rutgers.edu/database/>

Linköping University – Department of Computer and Information Science. (2014). *DEFRAM – A database for facilitating better energy efficiency assessments and improvements*. [Website]. Retrieved from: <http://www.ida.liu.se/~evabl45/defram.en.shtml>

<sup>112</sup> The Institute for Energy Efficiency in Productions' (EEP), Energy Efficiency Index of the German Industry which EEFIG members currently develop further to cover EU and G20 countries.

<sup>113</sup> The German Energy Audit Program for SMEs has been set up in 2012 with the objective to provide grants for energy audits to German SMEs. The funds are provided by the Federal Ministry of Economics and the state owned German promotional Bank KfW has operated the grant programme between 2012 and 2014. More than 13,800 firms received a grant under this programme. From 2015 onwards, the grant programme is operated by the agency BAFA, which is associated to the Federal Ministry of Economics. For further information please see below:

Fraunhofer -Institute for System and Innovation Research & IREES. (2014). *Evaluation des Förderprogramms „Energieberatung im Mittelstand“ Schlussbericht Im Auftrag des Bundesministeriums für Wirtschaft und Energie*. Retrieved from: <http://www.bmwi.de/DE/Mediathek/publikationen,did=676870.html>

be supported by the project development assistance facilities, light-touch energy audits where appropriate and justified. In addition, EEFIG supports the development of approved Lists of Eligible Materials and Equipment (LEME) which include equipment, appliances and/or materials which can be expected to achieve a minimum energy saving (>20% in EBRD case) when compared to market norms to be designed in conjunction with a related open List of Eligible Suppliers and Installers (LESI). Once established, the LEME/LESI lists should be made publicly available on a dedicated website and to project developers.

### **3.5.2. EEFIG Conclusions and Recommendations to Policy Makers**

EEFIG members, and their respective institutions, are convinced that the level of corporate energy efficiency investment in Europe can, and should, accelerate from current levels with the right reforms in place to prioritise these investments and address the barriers identified. This will require concerted policy-led and markets-led activities which act on the drivers of energy efficiency investment supply and the demand energy efficiency projects in all segments. Not only will this require a coherent and timely transposition of existing European framework legislation, but it will need the prioritisation of energy efficiency investments within the target companies.

To support and enable European policymakers to focus their resources on the most critical policy areas to stimulate corporate energy efficiency investments, EEFIG provides the following five priority areas for consideration:

- 1. Policy framework should positively support strong corporate energy efficiency investment choices at key points in their investment cycle, using a “carrot and stick” approach:** Some Member States have a supportive and coherent policy framework which encourages energy efficiency investments: starting with negotiated voluntary energy efficiency agreements with energy intensive industries, complemented with fiscal support and accelerated depreciation regimes for highly energy efficient investments and backed-up by rigorous and effective frameworks for energy audits that drive investment and the implementation of energy management systems. EEFIG encourages Member States to copy best practice from countries like Germany, Denmark, Sweden, Netherlands, UK and Ireland in these regards and connect these through the transposition of Articles 7, 8, 14, 16 and 17 of the Energy Efficiency Directive so that energy audits consider financing issues, are presented to key decision makers and lead to long-term holistic energy efficiency investment programmes. The mixture of incentives for swift action and penalties for non-compliance need to be well-balanced and sufficiently material to ensure that companies act in their own best interests. In Member States which allow direct energy subsidies through “volume purchase discounts” to boost competitiveness, more should be done to discourage link these subsidies and direct support through smart energy efficiency investments to ensure long-term competitiveness of those industries. If not then these “volume purchase discounts” themselves act to deter energy efficiency investments from those industries which most require them.
- 2. Public resources and facilitation should be engaged to establish dynamic and effective systems for sharing information and technical experience:** Policymakers at EU and Member State level play a critical role in facilitating dynamic and effective channels and tools that can practically support corporate decision makers and financial institutions in the identification of and investment in energy efficiency opportunities and pathways. These include: suggested EE metrics, indicators, suggested monitoring and evaluation procedures, technical standards, labels and test procedures for industrial equipment, lists of best available technologies and online benchmarking reference tools for selected segments (eg. Building EU energy intensity and energy efficiency investment performance databases

and online tools). With access to greater information that targets making smart, long-term energy efficiency investments that drive energy savings and competitiveness, companies will dedicate greater resources and focus into energy management and energy efficiency.

- 3. Ensure EU and national policies and resources are working effectively together to drive R&D and optimal energy efficiency outcomes:** Given the imbedded nature and inherent technic complexity to much of the required corporate energy efficiency investing and – in some Member States – the significant policy track-record in energy efficiency, EU Directives and associated resources should be especially well connected to and supportive of ambitious national policies. In practice this means that EU Directives should always have a net positive impact on national legislation (and not counteract any positive efforts already underway, eg. Sweden), be flexible around unitary measures (as long as convertibility is reasonably straight-forwards) and ensure that public R&D expenditures, demonstration facilities, compliance projects and experience sharing platforms and tools are collaborative and have maximum impact.
- 4. Support the standardisation of Energy Performance Contracts and the clarification of their regulatory, fiscal and accounting treatment:** EEFIG participants underline the growing importance and application of Energy Performance Contracts to drive corporate energy efficiency across all segments. The regulatory and accounting treatment for Energy Performance Contracts should fairly reflect their multiple benefits and risks without being overly conservative and thereby blocking much needed investment flows or making them shorter-term and more expensive. Companies which are holistically integrating energy management (via EnMS or ISO 50001) into their decision making and making “additional”, above business-as-usual energy efficiency efforts should be encouraged through small fiscal and accelerated depreciation mechanics to raise energy efficiency’s profile in corporate finance departments. Industry working groups to develop and ensure the uptake of standardised baseline negotiation and legal contracts for Energy Performance Contracts should be supported and subsidies which support excess energy consumption should be removed.
- 5. Energy efficiency opportunity identification and investible project pipelines should be supported with Project Development Assistance (PDA) facilities and Lists of Eligible Materials and Equipment (LEME) for SMEs:** Some of the most financially attractive energy efficiency investment opportunities exist in SMEs but their small size, heterogeneity, relatively high transaction costs and a general lack of technical energy efficiency project development experience targeting SMEs prevent these opportunities from becoming investible. Public resources should be channelled in the form of Project Development Assistance targeting SMEs to build investible pipelines of energy efficiency projects where there is high energy saving potential or clear “technology-driven” improvements to be made. Project Development Assistance programmes can be established based upon successful models (such as those managed by EIB, EBRD and KfW and other public financial institutions) but made broadly available helping to effectively utilise investment financing offered by public and private financial institutions and other entities and schemes. Finally, Lists of Eligible Materials and Equipment (LEME) which include equipment, appliances and/or materials which can be expected to achieve a minimum energy saving (>20% in EBRD case) when compared to market norms can be supported to work alongside and propagate SME investments.

### 3.5.3. EEFIG Recommendations to Market Participants

EEFIG members, and their respective institutions, are convinced that market participants, especially financial institutions, need to work closely with policy-makers and lead on the market-led activities to drive corporate energy efficiency which are highlighted in this report. Policy-led instruments and approaches cannot deliver the multiple benefits of energy efficiency alone, as this will require an increased focus, engagement, resource allocation and support to drive corporate energy efficiency investments from market participants and financial institutions.

To support and enable markets participants to focus their resources on the most critical areas in the delivery of these beneficial outcomes, EEFIG provides the following five priority areas for consideration:

**1. Raise energy efficiency opportunities at board-level and implement appropriate strategic resource investments to capture their multiple benefits within the natural company investment cycle:** To achieve this EEFIG sees two main requirements:

- i. The multiple benefits<sup>114</sup> of energy efficiency investments, including their impact on asset performance, operational costs, improved competitiveness and productivity must be measured, benchmarked and presented in ways in which key decision makers can understand and react to within a comprehensive energy management structure;
- ii. Energy management systems, ISO 50001, energy audits and the value-added role of proactive energy managers should be appropriately implemented to deliver long-term, holistic energy efficiency investment programmes as integral and strategic components of company investment plans.

**2. Financial institutions should more widely adopt best practice energy efficiency mainstreaming models to stimulate their clients' energy efficiency investments:**

Financial Institutions should adopt the “best practice” models of mainstreaming energy efficiency led by public financial institutions in three dimensions: ‘strategic mainstreaming’ meaning defining energy efficiency in key governing policies as ‘core’ business of the Financial Institution, having a dedicated in-house team of experts with technical and financial expertise to support banking origination, structuring and monitoring of investments and a so called ‘operational mainstreaming’ with investment targets and objectives set for client facing staff in each sector. This can also be supported by screening all existing and potential projects to identify opportunities for energy savings and providing free energy audits and energy management training to unlock savings potential for customers<sup>115</sup> or to follow JESSICA examples where two steps of project development assistance are incorporated into the financial instrument before a soft loan is provided. All financial institutions should pay closer attention to the competitive, de-risking and credit enhancing advantages which the most energy efficient companies among their clients demonstrate. Through increasing their own internal energy efficiency expertise, financial institutions can work more closely with technical specialists (connecting to and supporting EnMS and client internal energy managers) to help identify energy saving opportunities, select economically viable “finance ready” projects and develop a long-term investment

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<sup>114</sup> Meaning Energy Savings, Productivity Increases, Health Benefits, Acoustic Benefits, Social and Environmental Benefits and the many other site specific multiple benefits of energy efficiency. Please see below:

IEA. (2012). *Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements*. Retrieved from: [http://www.iea.org/publications/insights/insightpublications/Spreading\\_the\\_Net\\_FINAL.pdf](http://www.iea.org/publications/insights/insightpublications/Spreading_the_Net_FINAL.pdf)

<sup>115</sup> EBRD. (2015). *Improving Industrial Energy Efficiency: Thematic factsheet*. Retrieved from: <http://www.ebrd.com/downloads/research/factsheets/industriale.pdf>



programme for energy efficiency which can be presented as a core component of regular corporate finance proposals. EEFIG considers that it is time that this “virtuous circle” is launched and that energy efficiency project identification plays a more important and strategic role for EU financial institutions in general.

- 3. Encourage and support collaborative processes and consider R&D whose objective is to reduce the cost of and improve the up-take of energy efficiency investments:** EEFIG has identified a raft of necessary collaborative processes whose successful outcome will deliver energy savings, improved global sector competitiveness, enhanced productivity and reduce transaction and energy efficiency investment costs. These include work on: sector EE metrics, suitable indicators, monitoring and evaluation procedures, practical technical standards, labels and test procedures for industrial equipment, lists of best available technologies, Energy Performance Contract accounting treatment and online benchmarking reference tools for selected segments. Finally, while many energy savings technologies and products are out of the “lab stage”, their implementation and transaction costs can only be driven down with uptake, engagement and awareness from end-users. Proactive engagement through industry associations or work groups and joint R&D projects are critical to increase energy efficient product penetration and improve their supply chain efficiencies.
  
- 4. Standards should be developed for the legal terms in and process to negotiate energy performance contracts:** The standardisation of legal form and negotiation process for Energy Performance Contracts has been identified as a way to reduce their cost of execution and improve confidence between host and Energy Performance Contract provider. Standard models for: Legal contracts, negotiating processes, Energy Performance Contract procurement procedures, Energy Performance Contract adjudication, forecasting savings potential over baselines, measurement, verification, reporting, Energy Performance Contract finance and related energy savings insurance; will add volume to the Energy Performance Contract market and lower its costs of execution and finance as it professionalises.



## 4. Common Themes and EEFIG's Recommendations to the EU Commission

*"Energy efficiency has played and continues to play a sizeable role in the development of the global economy. This is nowhere more evident than in financial markets where energy efficiency is establishing itself as an important segment. Policy makers and private markets need to work further to support this essential driver of energy efficiency investment."* – Maria van der Hoeven, Executive Director of IEA.

EEFIG concludes with the strong sense that Europe is at a tipping-point and that energy efficiency investing has the clear potential to emerge into the mainstream as a key driver of competitiveness, economic value, innovation and employment across Europe.

### 4.1. What are the most imminent challenges to overcome?

While the buildings and corporate sectors are “oceans apart” and have very different stakeholders and regulatory frameworks, EEFIG participants have identified seven cross-cutting themes which the group concludes provides a non-exhaustive but useful framework to describe the imminent challenges facing energy efficiency investing in both sectors, in priority order:

#### 4.1.1. Driving Demand

A majority of EEFIG participants believe that the demand for energy efficiency investments is a lead priority in all sectors where energy use is not a strategic or primary concern for decision makers, and there is an assumption that this demand is key to drive the engagement of more financial institutions and the parallel development of new and tailored energy efficiency investment supplies of finance.

EEFIG sees “demand driving” as being a key responsibility of policy-makers and regulators; as opposed to the removal of barriers through transaction facilitation and execution, aggregation or finance supply development which are challenges whose responsibility falls more among market participants. To drive demand EEFIG participants certainly support a “carrot and stick” approach in general with some specific considerations:

- **A carrot without a stick is considerably less effective.** Driving demand is not the same as developing demand: The provision of project development assistance, technical assistance and/or temporal incentives certainly develops demand but only when combined with the enforcement of existing buildings regulations, the ambitious transposition of EU Directives and complementary policies which cause decision makers to focus on energy savings (such as the UK's CRC Energy Efficiency Scheme or Australia's Energy Efficiency Opportunity programme<sup>116</sup>). To really drive demand minimum energy performance standards should be considered for new and existing assets;
- **The appreciation of the multiple social and economic benefits of energy efficiency is insufficiently widespread in most Member States for the use of the stick without a carrot.** Forcing demand is different from driving demand: Member states have varied levels of awareness of the multiple benefits of energy efficiency and social tolerance for waste (eg. Observed recycling penetration in different countries). Many EEFIG participants believe that more resources need to be dedicated to achieving a “culture shift” in the minds of corporate and household decision makers to elevate the priority of energy efficiency investments. Negotiated voluntary agreements to increase energy efficiency in German industry backed with incentives are an interesting hybrid form of “carrot and stick” to align industry and government energy efficiency targets and whereby all companies applying for

<sup>116</sup> Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database: AU-5: Energy Efficiency Opportunities Program (EEO)*. Retrieved from: <http://iepd.iipnetwork.org/policy/energy-efficiency-opportunities-program-eeo>

the rebate on energy tax under the “*Spitzenausgleich*” need to introduce energy management systems or audits by the end of 2015<sup>117</sup>;

- **Perverse incentives which improve the economics of profligate energy use should be changed to incentivise energy efficiency investments.** In 2011, the Commission drafted new rules on Energy Taxation to amend Directive 2003/96/CE, promote energy efficiency and remove unjustified subsidies to high carbon energy sources whose draft text was voted down in the EU Parliament in 2012 due to austerity and the then high fuel costs. With the recent and dramatic fall in energy prices and EU economic recovery, EEFIG considers that a new review of distorting fiscal policies which hamper energy efficiency investments is in order.

#### 4.1.2. *Managing Uncertainty*

In addition to identifiable risks (eg. Future energy prices), energy efficiency investors are required to manage significant amounts of uncertainty including a general lack of reliable and trusted energy efficiency investment performance data, except in large energy-intensive industries. Uncertainty is created by the lack of objective and coherent energy and/ or financial performance data for financial institutions and decision makers to interrogate prior to making new energy efficiency investments. It is also because the system performance of an energy efficiency investment is a complex interaction of the individual performance of a number of energy savings measures combined with external and/ or human factors. Uncertainty is treated very differently from risk by financial institutions who consider themselves consummate risk managers but whose credit committees are usually highly “uncertainty averse”. The result is a lack of appetite for energy efficiency investments, low motivation for new entrants to offer energy efficiency finance and increased financing costs (to overly compensate for the unknowns).

EEFIG participants see the energy efficiency sector making positive strides in this area and chose to highlight the following:

- **Open access to historic energy usage data for energy efficiency project developers:** While the roll-out of smart meters, the increased penetration of intelligent appliances and thermostats is a very positive trend for energy efficiency, EEFIG participants believe that energy efficiency investment activity would increase if project developers had more easy access (respecting data protection) to the actual historic energy usage data of their target customers such that, leveraging the mandatory energy audits process, it can easily and cheaply be integrated into their proposals. The fact that much of this data sits in the exclusive domain of energy supply and/ or distribution companies is blocking the markets development in many EU Member States;
- **Energy usage data provision should be a requirement of energy efficiency investments which benefit from public finance:** From a “value for money” perspective, public energy efficiency finance support (direct or indirect) should require the beneficiary to provide/ enable access to its ex-ante energy use data for at least the term of the intended energy efficiency investment (currently the case for several public Financial Institutions including Kredex, but not all). There will be a cost to the extraction, management and subsequent making available of this data to the sector which as a “public-good” could be funded by EU programmes such as ESIF or Horizon 2020. Mechanisms should be found to allow financial institutions to more pro-actively collaborate on the creation of energy efficiency investment benchmarks and data sets;

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<sup>117</sup> Review of the German Industrial voluntary agreement policies found below:

Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database: GE-2: Voluntary agreements with German industry*. Retrieved from: <http://iepd.iipnetwork.org/policy/voluntary-agreements-german-industry>

- **Greater investment in, promotion, awareness, input to and use of online energy efficiency investment benchmarking tools:** EEFIG participants have identified five useful online tools<sup>118</sup> which provide insights for prospective energy efficiency project hosts and investors including: Energy Intensive Curve (£300mm of mainly UK EE investments); Green Button (US database with energy use data for 60 million customers used for benchmarking in commercial and residential buildings sectors); IIP's Industrial Efficiency Technology Database (Global research and benchmarks for cement, iron, steel and pulp & paper sectors plus electric motor driven systems); Investor Confidence Project (containing financial performance data for 12,000 US home energy efficiency loans) and US Department of Energy supported Industrial Assessment Centres Database (containing 16,700 assessments and over 120,000 recommendations). In addition, EEFIG is aware of a pilot open-source, data & benchmarking EEII platform<sup>119</sup> containing macroeconomic energy performance data, survey responses from audits, management systems and performance certificates for industrial energy efficiency which has the potential to identify and to address challenges on a continuous basis and allowing for cross-country comparisons.

### 4.1.3. Distribution and Aggregation

A critical challenge arises from the fact that many attractive energy efficiency investments are of small size and broadly distributed across large numbers of homes, mid-cap companies or SMEs where energy cost and usage has not been a primary or strategic concern. Moreover, energy efficiency improvements are often part of larger projects and often are hard to disaggregate. To engage with this opportunity, financial institutions require access to low cost, retail distribution channels that are supported by the right levels of technical and technology resources to cost-effectively identify, process and aggregate many thousands of similar energy efficiency investments into bundles delivering project and counterparty diversity as well as cheaper access to the broader wholesale capital markets.

At present, partly due to the heterogeneous nature of energy efficiency investments and partly due to the immaturity of the market for such investments (compared with mortgages or car loans), the relative costs of project development, finance documentation, processing and aggregation (together “transaction costs”) are high making entry into this business unattractive for many financial institutions.

Aggregation of small investments can be undertaken with the support of local and regional authorities, and other intermediaries such as trade federations or chambers of commerce, banks, post offices, utilities and other businesses with retail customers. Aggregation is key to reducing transaction costs for due diligence processes, but also for project development e.g. joint procurement, standard measures, etc. Aggregation of projects can take two main forms: “pooling” refers to the aggregation of different projects belonging to the same client, which may be similar or different (e.g. a municipality renovation offices, swimming pools and sports facilities through a single energy performance contract); or “bundling” refers to the aggregation of similar projects belonging to different clients.

<sup>118</sup> Website links respectively:

The Crowd. (2015). *Energy Investment Curve*. [Website]. Retrieved from: <http://thecurve.thecrowd.me/>

Green Button Data. (2015). *Green Button*. [Website]. Retrieved from: <http://www.greenbuttondata.org/>

Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved: <http://iepd.iipnetwork.org/>

Investor Confidence Project. (2014). *Enabling Markets for Energy Efficiency Investment* [Website]. Retrieved from: <http://www.eeperformance.org/>

Rutgers University. (2014). *Industrial Assessment Centers Database* [Website]. Retrieved from: <http://iac.rutgers.edu/database/>

<sup>119</sup> The ‘Energy Efficiency Index of Industry’ is derived from EEP’s Energy Efficiency Index of the German Industry in partnership with EEIP and the University of Linköping. With an open-source approach, it has a focus on evaluating and disseminating the environment for industrial energy efficiency in the EU and G20 countries to reduce risks, uncertainties and unknowns, to make direct cross-country comparisons possible and to stimulate learning and exchange of policies and solutions for specific contexts.

Standardisation is a necessary corollary of aggregation in reducing transaction costs and is defined in detail in Section 5.1.10. Aggregation and standardisation are key to allow refinancing and potentially securitisation of energy efficiency investments. A bank or an energy performance contract provider may need to release its balance sheet and would therefore sell it (partly or totally) to another financial institution or to an investor via the capital markets. This is currently complicated as assets are small and not comparable, which prevents access to the capital markets. The use of new technologies, smarter tools and “clustering” approaches are also emerging with the potential to significantly reduce transaction costs, as energy efficiency’s equivalent of the “solar PV cost curve” reductions or horizontal drilling. These three trends are working together to compress transaction costs:

- **New Technologies:** Strong progress is being made in Buildings Information Modelling, open source energy data sets (eg. “Green Button” in the USA) and with the engagement of Google in the smart home energy savings market through its \$3.2 billion acquisition of Nest Labs<sup>120</sup>, considerable investment is being undertaken in this area;
- **Smarter Tools:** Widely used by EBRD in its 20 Sustainable Energy Finance Facilities<sup>121</sup> are Lists of Eligible Materials and Equipment (LEME) which include equipment, appliances and/or materials which can be expected to achieve a minimum energy saving (>20% in EBRD case) when compared to market norms to be designed in conjunction with a related open List of Eligible Suppliers and Installers (LESI). Once established, the LEME/LESI lists should be made publicly available on a dedicated website and to project developers. These LEME can act as the “building blocks” for project developers to more easily bundle various project components into a single transaction;
- **“Clustering Approaches”:** Examples include infra-red imaging of whole streets of similar properties, more extensive mining of property registers to identify poorly insulated buildings-types or those using heating oil, “energy savings kit” approaches for hotel chains, bank branches or retail franchise chains which is also leading to the creation of specialised ESCOs for these different SME subsectors and the engagement of Trade Associations to help roll-out sector solutions.

#### 4.1.4. Blending Grants and Loans

The efficient blending of grants and loans (from both public and private sources) was raised in many of EEFIG’s discussions as critical to achieve EU energy efficiency targets especially in the more disaggregated sectors such as residential buildings and SMEs and in the context of energy efficiency funding using ESIF 2014-2020.

On this subject, EEFIG participants expressed several preliminary considerations:

- The existence of grants to support energy efficiency investments should not hold-up or subsidise already economically attractive opportunities, or create an artificial market which would collapse once the grants are withdrawn, and yet are needed to address market failures (especially those identified in ex-ante assessments) and the fact that investment activity is currently at substantially sub-optimal levels;
- Technical assistance, capacity building and project development assistance grants are important to grow the pipeline of energy efficiency investments, but their application must deliver a proportionate quantity of “investment-ready” projects as a core and measureable outcome;

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<sup>120</sup> Google’s January 2014 press release announcing Nest Labs acquisition, please see below:

Google. (2014). *Google to Acquire Nest*. Retrieved from: <https://investor.google.com/releases/2014/0113.html>

<sup>121</sup> EBRD Sustainable Energy Initiative. (2014). *Developing Corporate Energy Efficiency: Managing Resources to Boost Productivity*. Retrieved from: <http://www.ebrd.com/downloads/sector/eccc/managing-resources.pdf>

- Public funds, tax breaks or grants should be used to incentivise energy efficiency investments that are “societally optimal” as opposed to “profits maximising” (such as deep renovation or a holistic corporate energy efficiency programme) in recognition of (and in proportion to) the societal benefits the additional investment creates (such as employment, reduced emissions etc.). Furthermore, these public incentives can be used to de-risk (and potentially improve the regulatory capital treatment for) societally optimal energy efficiency investments (particularly in SMEs) through the provision of guarantees, interest-rate reductions or subordinate finance;

Fortunately, several of the energy efficiency investment programmes of public financial institutions (such as KfW, EBRD, EIB and Kredex) illustrate best practice approaches to the blending of grants and loans to deliver high leverage ratios of public funds to private capital invested through the networks of private bank finance partners. While these programmes are still growing, maturing and being adjusted to the local conditions of different EU Member States, EEFIG supports this approach to address market failures and incentivise additional energy efficiency investments.

Certain features of the best practice approaches to blending grants and loans deserve specific mention:

- Single, streamlined application and approval process through multiple retail facing outlets with clear criteria and a swift response (as opposed to multiple channels with separate application and operating procedures and agents);
- Increased grant component, lower interest rates and/ or public support for ambitious levels of, and verifiable, energy savings;
- The structural incorporation of an independent energy (or technical) advisor who delivers trust and confidence into the process for both client and investor, provides programme outreach and can help scope and manage the project;
- The provision of project development assistance to build investment project pipelines;
- High levels of data capture on realised energy and financial investment performance (which will combine to create the public good of a solid track-record of energy and financial performance of energy efficiency investments).

In the context of ESIF 2014-2020, EEFIG has high hopes that these best practices will be implemented by managing authorities in Member States and delivered through the increased use of financial instruments, including off-the-shelf financial instruments as described by the Commission in implementing regulation 964/2014<sup>122</sup>, especially the “Renovation Loan”; and also by the European Fund for Strategic Investments (EFSI) being created within the EIB<sup>123</sup> that can mobilise greater energy efficiency investments in the EU’s built and corporate infrastructure, boosting job creation and delivering their clear environmental and competitive benefits. EEFIG participants also note that best practice blending programmes of grants and loans which address market failures and deliver additional energy efficiency investments should receive fast-track State-Aid regulatory clearance. Finally, ESIF, EFSI and public financial institution programmes need to work in a complimentary fashion to address energy efficiency investments in buildings, industry and SMEs at a Member State level and not create confusion in the market from the user’s perspective.

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<sup>122</sup> Implementing regulation found below:

OJ L 271/16, 12.9.2014. Retrieved from: [http://www.seupb.eu/Libraries/2014-2020\\_Programmes/964-2014\\_ImplementingReg\\_FinancialInstruments.sflb.ashx](http://www.seupb.eu/Libraries/2014-2020_Programmes/964-2014_ImplementingReg_FinancialInstruments.sflb.ashx)

<sup>123</sup> For full information on the new European Fund for Strategic Investments (EFSI) please see below:

EIB. (2015). *Investment Plan for Europe*. [Website]. Retrieved from: <http://www.eib.org/about/invest-eu/index.htm>



#### 4.1.5. Accounting treatment of energy efficiency investments

Despite the multiple benefits that energy efficiency brings it faces deployment challenges because of balance sheet accounting interpretation and treatment. Companies with limited ability to raise debt or who focus their investments exclusively in strategic areas are reticent to divert funding into energy efficiency despite the often more attractive investment returns. These companies, however, are interested in the EE project going ahead and sharing the savings if the project can be funded by a third party and not be accounted for on the company's own balance sheet.

This poses a challenge to the third party investor: they must either account for the assets on their balance sheet or seek an off balance sheet or alternative structure. Frequently, the EE project can include technologies that are integrated into the manufacturing process or building fabric of the host, the accounting treatment for the EE project requires detailed analysis of the legal contracts and financial structures by accountants and auditors in order to assess the appropriate accounting treatment. This additional structuring to the EE project increases costs and delays project implementation. It also increases risks that the project is ultimately deemed on balance sheet and then may be abandoned with costs having been already incurred.

This “accounting risk” puts companies off even starting the project and so the EE project gets trapped between not having enough development time to get to an agreed “off balance sheet structure” with the auditors, and the company not having enough confidence that the project will be off balance sheet to approve transaction costs to develop the project to get auditor sign-off. One of the key issues that needs to be addressed is therefore the applicability and usefulness of the current accounting standards and treatment for energy efficiency investments, and the applicable rules thereof.

A fair and balanced accounting treatment of investments designed to deliver energy (and therefore cost) savings which does justice to the economic reality of the investment and which does not overly penalise energy efficiency investments by “not seeing” their multiple benefits is also requested by markets participants from both the buildings and corporate sectors. Issues requiring clarification include the determination of whether (and which type of: Energy Performance Contract, ESA, On-bill, PACE etc) energy efficiency investments are considered, like outsourcing, as an operating lease (IFRIC 4<sup>124</sup>) and therefore captured by accounting rules IAS 17<sup>125</sup>. For governments and local authorities, the accounting treatment of the debt and expected multiple benefits (and risks) of energy efficiency investment requires specific guidance as the accounting treatment of “service contracts” is very different from that accorded to Public Private Partnerships (for example).

EEFIG suggests that an “over conservative” approach to fully accounting all the debt associated with energy efficiency investments on-balance sheet and neglecting to value the associated risk-adjusted asset created by that investment – the energy savings – even if guaranteed by a third party under contract (or insured) is inappropriate and blocks the flow of investment into energy efficiency. EEFIG recommends that Ministries of Finance of EU Member States require further analysis into the most appropriate accounting treatment for on and off balance sheet financing for energy efficiency projects. This analysis should identify recommended templates on how best to account for energy efficiency projects to facilitate implementation for companies.

Hybrid approaches were discussed such as the accounting for energy efficiency investments at their risk-adjusted NET value requiring the accurate and periodic assessment of the net fair value of the

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<sup>124</sup> In the USA, EPCs have been treated as operating leases and hence received off-balance sheet treatment for the host, until the 2013 FASB review of the accounting treatment for operating leases. IAS lease definition found below:

IASPlus. (2015). *IFRIC 4 – Determining Whether an Arrangement Contains a Lease*. [Website]. Retrieved from: <http://www.iasplus.com/en/standards/ifric/ifric4>

<sup>125</sup> Full definition please see below:

IASPlus. (2015). *IAS 17 – Leases*. [Website]. Retrieved from: <http://www.iasplus.com/en/standards/ias/ias17>



expected liability payments and economic benefits (like a swap or hedge contract<sup>126</sup> - i.e. energy efficiency investment as a hedge against future energy expenditures). Under this approach a well-structured Energy Performance Contract with guaranteed savings might well begin life with a net positive expected value on balance sheet (or zero – and therefore to all intents and purposes be akin to “off balance sheet”) to the host with inverse accounting treatment for investor; although periodically as energy savings do or don’t materialize, energy prices change as do credit qualities of counterparties, the risk-adjusted net fair value of the contract would be adjusted.

#### 4.1.6. Investment Horizon Period and Optimal Scope

EEFIG is concerned in all sectors by the tendency of companies and buildings owners to invest in just the energy efficiency measures with short-term paybacks (less than 3 years, the “low hanging fruit”) instead of implementing a holistic and considered long-term<sup>127</sup> package or programme of measures targeted to deliver economically optimal scope and level of energy savings over the likely useful life of their asset (industrial process or building).

There is a long list of factors which contribute to the selection of sub-optimal packages and short payback periods for energy efficiency investments and EEFIG participants highlight these:

- **“Optimal” from whose perspective ?** What is economically optimal to a company with a 10-20% internal Return on Investment (ROI) hurdle rate is very different from what is economically optimal from a national or societal stand-point. A company’s financial discount rate will relate to its opportunity cost of capital and at a time of scarce long-term investment funding companies this should be significantly higher than the “societal discount rate”<sup>128</sup> which national policymakers apply. In addition, several studies<sup>129</sup> calculate the significant societal benefits created by greater amounts of energy efficiency investing (employment, emissions reductions, reduced health costs) which are invisible to the corporate or homeowner decision maker unless they are monetised for them in the form of direct or indirect financial support (public grants/finance or fiscal incentives). To align these perspectives EEFIG participants favour the incremental provision of direct and indirect public financial support mechanisms for long-term and additional energy efficiency investments which move to monetise the multiple benefits created by companies and buildings owners’ decisions to pursue societally optimal long-term transformations of their assets and avoid the “lock-in” effect (making future energy efficiency investments more expensive or delaying them) that can be created by only investing over the short-term;
- **Overall access to and supply of long-term finance impacts Companies’ and Individuals’ ability to consider a long-term Horizon Period:** Access to, supply and cost of long-term energy efficiency investment finance are highly correlated with the resolution of the accounting and regulatory issues (discussed in sections 4.1.1 and 4.1.2), perceived regulatory stability, implementation of mechanisms to resolve split incentives (eg. On-bill finance) and the full integration of energy efficiency (and its multiple benefits) as a priority attribute of all buildings and industrial process upgrades;
- **De-risking long-term decisions:** Energy efficiency investments are, by their nature, complex as their successful economic outcome is derived from a combination of uncertain future developments including: Continued competitiveness or use of underlying asset (process or building), energy prices, climatic conditions, operator/ occupant behaviour, economic growth etc. Strategic long-term investments are a necessity for companies to

<sup>126</sup> IASplus. (2015). *IAS 39 – Financial Instruments: Recognition and Measurement*. [Website]. Retrieved from: <http://www.iasplus.com/en/standards/ias/ias39>

<sup>127</sup> Long-term for a company maybe 5-10 years, but for buildings it is more aligned with mortgage terms (eg. 20-40 years)

<sup>128</sup> Ley, E. *On the Improper use of the Internal Rate of Return in Cost-Benefit Analysis*, World Bank Institute, Washington D.C., 2007

Moore, M. A., Boardman, A. E., Vining, A. R., Weimer, D. L. and Greenberg, D. H. (2004), “Just give me a number!” Practical values for the social discount rate. *J. Pol. Anal. Manage.*, 23: 789–812. doi: 10.1002/pam.20047

<sup>129</sup> See bibliography for studies by Fraunhofer ISI, Copenhagen Economics, E3G and IEA.



remain competitive and for commercial buildings to remain economic and therefore it is critical that energy efficiency is seen as a “strategic asset” at executive board level. In addition, a stable regulatory environment, long-term Energy Performance Contracts, vendor energy service companies, specialist investors focused on long-term energy efficiency investments, public first-loss facilities, the use of Net Present Value (NPV) calculations instead of simple payback periods and long-term insurance products will help de-risk long-term energy efficiency investment decisions.

#### 4.1.7. *Financial Institution “Regulatory Issues”*

As the new regulatory capital requirements of Basle III impact EU banks, and Solvency II impacts insurers, the availability of risk capital and balance sheet for all financial institutions is under pressure and impacts energy efficiency investments in all categories. Indeed EFIG participants are concerned that these new regulations are often blind to environmental risks<sup>130</sup> and many of the long-tail impacts of climate change and the stranded assets that unsustainable and low resilience investing can create.

For these reasons, EFIG recommends to the European Commission to take into account the specific risk of energy efficiency investing in view of the up-coming revision of financial policy and regulation in the context of the different Commission initiatives (e.g. the public consultation processes for the Capital Market Union roadmap and the Prospectus regime, the Banking Union, the European Long-term investment regulatory framework or the recent European Fund for Strategic investment - EFSI).

In respect of banking and insurance regulations<sup>131</sup>, the focus should be on whether the capital adequacy ratios are appropriate for Energy Efficiency investments, i.e. not overly high for the underlying risks, therefore stressing the importance of a good assessment of those risks. The EU Capital Requirement Regulation and Directive (CRR/CRD IV) apply to credit institutions and to investment firms that fall within the scope of the Markets in Financial Instruments Directive (MiFID). In particular the risk-weighting under pillar 1 of the CRD IV requires ensuring that the regulatory capital and the liquidity requirements (Liquidity Coverage Requirement Delegated Act) required for any specific asset are in line with the actual risk profile of that asset. Insurers are subject to a separate set of regulatory capital; the requirements of the Solvency II directive and its delegated act, setting the rules for a market-consistent valuation of assets and liabilities.

There is a parallel (and even a connection with respect of both solutions) between EFIG’s views on the accounting and regulatory treatment for energy efficiency investments: A “fall-back”, ill-informed or overly conservative accounting and regulatory treatment for energy efficiency investments which neglects to value the inherent multiple benefits and risk mitigating characteristics that form an integral part of the rationale for such investments makes it unnecessarily hard for financial institutions to allocate investment capital to them. While EFIG does not think there is a “single solution”, participants suggest that the solution contains “an engaged process” which improves all parties’ understandings of this investment class and can also bring value to investment standards processes and would go hand-in-hand with other initiatives proposed in this report.

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<sup>130</sup> CISL & UNEP FI. (2014). *Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III?* Retrieved from <http://www.unepfi.org/fileadmin/documents/StabilitySustainability.pdf>

<sup>131</sup> While EFIG considered the issues of a differentiated risk weighting in corporate accounting rules and the banks’ and insurers’ risk as the main and most important regulatory issues, there are other financial sectors and regulations which may be also considered to take account the risk specifics of energy efficiency investments: such as the initiatives regarding EU saving accounts deposits, investing in green infrastructure, the specific transparency requirements for crowd funding or peer-to-peer lending platforms, the widening of the investor base for SMEs and specialised SME markets, the efforts to liquid and transparent secondary markets for corporate bonds, the initiatives for comprehensive and consistent prudential approaches for securitisation, including transparent standardisation of key information, the plans to review the eligible assets under the UCITS directive to include SME fulfilling certain characteristics, the revision of EU corporate governance regulation to better align long-term interests of institutional investors, asset manager and companies, the discussions about the creation of a single market for personal pension products to support investment in long-term and sustainable assets and the Sustainable Securities Exchange initiative with possible impacts on the Prospectus Directive and others.



## 4.2. EEFIG's Conclusions and Recommendations to the European Commission

In the context of these cross-cutting and most imminent challenges but not wishing to lose the granularity of its specific sectoral recommendations to policy makers, in this last section EEFIG draws its conclusions for and makes a consolidated set of recommendations directed towards the European Commission. For clarity, EEFIG's conclusions and recommendations to the European Commission are divided into the report's two areas of focus (Buildings and Industry) with a few final cross-cutting remarks directly concerning financial institutions:

### 4.2.1. Buildings Sector

As the EU counterpart to the six EEFIG buildings recommendations to policy-makers described in Section 2.8.2 of this report, EEFIG sees a natural opportunity for the European Commission to consider the following six priority actions:

1	Ensure the effective transposition of existing EU Directives and effective local enforcement procedures regarding the energy performance of buildings (including their performance certification) and increase the Commission's internal buildings-specific resources dedicated to energy efficiency.
2	Deliver regulatory stability for energy efficiency investments in buildings through the provision of coherent, long-term regulatory pathway visibility, with respect of energy efficiency, and internally consistent 2020, 2030 and 2050 targets delivering jobs, growth and competitiveness and delivering Europe's emissions reductions commitments in a least cost fashion.
3	Address the need for high quality buildings performance data and standards through Commission support of best practice policies and initiatives within Member States and act to resolve collective issues such as the privacy and ownership questions for public-service or public funded energy data. In addition, the EU should consider the potential public roles in the provision and support of an "open-source" buildings energy data clearing-house and database to build the necessary market confidence in buildings performance.
4	Initiate a review and benchmarking process to better understand the decision making frameworks for public buildings owners, managers and their technical facilities staff with aims to remove accounting, reporting and procurement hurdles for investment in energy efficiency investments in, and create standard procurement procedures for, EU public buildings.
5	Benchmark and compare the relative successes of retail residential energy efficiency investment programmes in the Member States to ensure standards and best practice are shared and replicated taking into account national circumstances.
6	Ensure that Member States adequately identify the funding streams for their National Buildings Renovation Strategies (article 4 of Energy Efficiency Directive) with the proactive inclusion of financial instrument to support energy efficiency investments in buildings (covering structural and investment funds 2014-2020, Horizon 2020, energy efficiency obligation schemes (Article 7) and funds coming from ETS revenues). Use ESIF to fund Project Development Assistance Facilities for Buildings with target leverage factors according to Member State needs and following best practice.

### 4.2.2. Corporate Sector (Industry & SMEs)

As the EU counterpart to the five EEFIG recommendations to policy-makers governing companies, described in Section 3.5.2 of this report, EEFIG sees a natural opportunity for the European Commission to consider the following five priority actions:

1	Ensure the effective transposition of existing EU Directives with particular attention to Articles 7, 8, 14, 16, 17 and Annex VI of the Energy Efficiency Directive to ensure the increased visibility and financial rigor of energy audits and that they connect with and support the spread of best practice national legislation from Member States with proven track records of delivering ambitious energy efficiency outcomes from their industries and companies.
2	Help deliver regulatory stability for, and greater visibility to, long-term corporate energy efficiency investment programmes through direct engagement with Member States around regulatory pathways and a set of “best practice” implementing policy measures which may include: ambitious negotiated voluntary industry agreements together with appropriate and cost effective fiscal incentives and appropriate accounting rules to stimulate energy efficiency investments that are commensurate with Europe’s 2020, 2030 and 2050 climate and energy targets.
3	Address the need for dynamic and effective systems for sharing information and technical experience through Commission espoused processes to help identify and substantiate corporate energy efficiency metrics, indicators, monitoring and evaluation procedures, technical standards, labels and test procedures for industrial equipment, lists of best available technologies and online benchmarking reference tools for selected segments. In addition, consider the potential public roles in the provision and support of an “open-source” EU corporate process energy intensity database and ways to collect and standardise corporate energy efficiency investment performance.
4	Initiate a review process to better understand and develop the energy performance contracting (Energy Performance Contract) market with aims to remove any unbalanced accounting, reporting, regulatory and procurement hurdles for Energy Performance Contract origination and financing, and support the development and adoption of standard legal terms and procurement procedures for Energy Performance Contracts.
5	Support the extension of Project Development Assistance facilities (modelled on best practice from EIB, EBRD and KfW) which will build capacity among SMEs, and the developer and certified energy auditor networks serving SMEs, to develop and launch investment-ready energy efficiency projects, Lists of Eligible Materials and Equipment and thus enable more effective utilisation of available financing sources for investments, including private sector financial institutions.

### 4.2.3. Financial Institutions

The European Commission should focus strongly on scaling-up the use of successful financial instruments and proven solutions at international, national or regional level that address market barriers which obstruct the greater deployment of energy efficiency investments (most of which are highlighted in this report). There are three specific recommendations flow directly from this observation and the work of EEFIG:

- 1. Ensure that new regulatory frameworks for financial institutions do not prejudice energy efficiency investments:** Flowing from its cross-cutting driver analysis, EEFIG recommends that the Commission to review the Solvency II risk class for and Basle III risk-capital assessment approach to energy efficiency investments to ensure that their treatment is not unduly restricting EU banks, funds and insurance companies from making long-term energy efficiency investments in buildings and with their corporate clients. Furthermore, EEFIG supports the implementation of the Non-Financial Reporting Directive to improve availability of data for investors which includes energy use and efficiency and for the Commission to pass and implement the Shareholder Rights Directive to improve investor engagement with listed companies on sustainability and energy issues;
- 2. Ensure that technical assistance and project development assistance facilities are compatible and can be easily combined with market-based and concessional funding by qualified and experienced financial institutions:** In order to support the opening of new market distribution channels and offer “one-stop shop” financing for energy efficiency investments, EEFIG considers that assistance should be offered directly to project developers and through multiple agents and financial institutions, as appropriate, demonstrating a dependable track record and solid internal processes and procedures, providing that all relevant safeguards are met. Furthermore, the European Commission should consider entrusting the implementation of the new mechanisms outlined above to a wider variety of qualifying institutions with successful track-record in rolling-out energy efficiency investment programmes;
- 3. Ensure that public refinancing facilities, like those operated by the European Central Bank, confirm eligibility for financial instruments relating to energy efficiency:** European Central Bank should officially confirm that financial instruments relating to energy efficiency, which meet the criteria defined in particular in the decision of 19<sup>th</sup> November 2014 (ECB/2014/45)<sup>132</sup>, may be repurchased under different programs including Targeted Long-term Refinancing Operations (LTROs) and thereby delivering a strong signal to commercial banks registered at ECB to encourage them to increase their assets dedicated to energy efficiency funding.

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<sup>132</sup> European Central Bank. (2014). *DECISION OF THE EUROPEAN CENTRAL BANK of 19 November 2014 on the implementation of the asset-backed securities purchase programme.* (ECB/2014/45). Retrieved from: [https://www.ecb.europa.eu/ecb/legal/pdf/en\\_ecb\\_2014\\_45\\_f\\_sign.pdf](https://www.ecb.europa.eu/ecb/legal/pdf/en_ecb_2014_45_f_sign.pdf)



## 5. Appendices

The following sections have been removed from the main body of the EEFIG final report and placed into these appendices to simplify its reading; however they are integral to EEFIG's work and analysis and provide the expert reader with greater insights into the detail and specifics of the group's methodology, process and deliberations.

### 5.1. Glossary of Terms

Certain key terms are widely used in this report and among energy efficiency markets participants. This glossary defines these key terms for readers to understand the meaning which EEFIG attaches to each of them in this context:

#### 5.1.1. Energy Performance Certificate

An Energy Performance Certificate is a certificate recognised by a Member State, or by a legal person designated by it, which indicates the energy performance of a building or building unit, calculated according to a methodology (adopted at national or regional level) in accordance with a common general framework. This common general framework includes the following elements:

1. The energy performance of a building shall be determined on the basis of the calculated or actual annual energy that is consumed in order to meet the different needs associated with its typical use and shall reflect the heating energy needs and cooling energy needs (energy needed to avoid overheating) to maintain the envisaged temperature conditions of the building, and domestic hot water needs.
2. The energy performance of a building shall be expressed in a transparent manner and shall include an energy performance indicator and a numeric indicator of primary energy use, based on primary energy factors per energy carrier, which may be based on national or regional annual weighted averages or a specific value for on-site production.
3. The methodology for calculating the energy performance of buildings should take into account European standards and shall be consistent with relevant Union legislation, including Directive 2009/28/EC.
4. The methodology shall be laid down taking into consideration at least the following aspects:
  - The following actual thermal characteristics of the building including its internal partitions including: Thermal capacity; Insulation; Passive heating; Cooling elements; and Thermal bridges;
  - Heating installation and hot water supply, including their insulation characteristics;
  - Air-conditioning installations;
  - Natural and mechanical ventilation which may include air-tightness;
  - Built-in lighting installation (mainly in the non-residential sector);
  - The design, positioning and orientation of the building, including outdoor climate;
  - Passive solar systems and solar protection;
  - Indoor climatic conditions, including the designed indoor climate;
  - Internal loads.
5. The positive influence of the following aspects shall, where relevant in the calculation, be taken into account:
  - Local solar exposure conditions, active solar systems and other heating and electricity systems based on energy from renewable sources;
  - Electricity produced by cogeneration;
  - District or block heating and cooling systems;
  - Natural lighting.



6. For the purpose of the calculation buildings should be adequately classified into the following categories:
- Single-family houses of different types;
  - Apartment blocks;
  - Offices;
  - Educational buildings;
  - Hospitals;
  - Hotels and restaurants;
  - Sports facilities;
  - Wholesale and retail trade services buildings;
  - Other types of energy-consuming buildings.

### ***5.1.2. Energy Performance Contract***

An Energy Performance Contract is a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed (and often guaranteed) level of energy efficiency improvement or other agreed energy performance criterion, such as the financial savings derived from the physical energy savings. The Energy Performance Contract provider is often referred to as an Energy Service Company (“ESCO”) although Energy Performance Contracts can be provided by multiple parties.

EEFIG notes that energy performance contracting covers a variety of arrangements on different parameters of the contract, so that it is difficult to talk about a unique instrument. Policy-makers and financial institutions should be aware of such distinctions in order to better focus on the type of contract that fit their needs.

For instance, provision of finance in Energy Performance Contract can be ensured by the client based on their equity, or by a third-party lending to the project host, or by the ESCO, which in turn can source finance through debt, but also in some cases through leasing. It should be noted that “third-party financing” in an Energy Performance Contract refers to debt financing provided to the project host in Anglo-Saxon countries, whereas in some parts of Europe it may refer to ESCO financing.

The core business of the Energy Performance Contract provider also varies with the type of measures and resulting payback times (ranging from re-lighting to deep retrofit of the building envelope), as well as the inclusion of finance or energy supply in the contract. Energy Performance Contracts can be delivered by equipment vendors (sensors, BMS, lighting systems), heating management / facility management companies, construction companies, financial institutions, special purpose vehicles, etc. Certain financial instruments and case studies were raised frequently during EEFIG discussions and are identified, with best practice examples

### ***5.1.3. European Structural and Investment Funds 2014-2020***

European Structural and Investment Funds 2014-2020 (shortened to ESIF in this report) are the following five EU funds: European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). The Funds are managed under the 'shared management' principle, meaning that the programming of the spending is developed in a dialogue between Member States and the Commission. Afterward, the EU Member States are primary responsible for the selection, implementation and monitoring of the co-funded projects. Their operation is based on the Common provisions regulation (Regulation N°1303/2013) and Fund's specific Regulations.

The Regulation sets out the provisions necessary to ensure the effectiveness of the ESIF and their coordination with one another and with other EU instruments. ESIF beneficiaries<sup>133</sup> can range from small and medium size enterprises (SMEs) to large enterprises, and from public bodies to non-governmental and civil society organisations. These beneficiaries can also be universities, students, researchers, farmers or fishermen.

Given the significant size of the public funding available through ESIF and its material impact on national investments, especially in low income countries, EEFIG is keen to ensure that those monies apportioned to Energy Efficiency lever the maximum amount of private capital and, as often as possible, utilize appropriate financial instruments taking into account specific national and sub-sectoral conditions.

#### **5.1.4. Financial Institution**

A Financial Institution is an establishment that focuses on dealing with financial transactions, such as investments, loans and deposits. A financial institution usually provides financial services for its clients or members. Most financial institutions are regulated by the government. Conventionally, financial institutions are composed of organisations such as banks, trust companies, insurance companies, fund managers and investment dealers. EEFIG underscores its intention in the use of the term financial institution to recognise that energy efficiency investments are made by a wide range of financial institutions (ie not just banks) and that all of these potential investors needs to be engaged to reach the levels of energy efficiency investment required in Europe to meet its targets.

International Financial Institutions (IFIs) are financial institutions that have been established (or chartered) by more than one country and hence are subjects of international law. Public Financial Institutions are those financial institutions established with public capital (which includes all IFIs) with a specific policy mandate. For the purpose of this report, EEFIG includes as Public Financial Institutions EIB, EBRD, World Bank, KfW, Kredex and other public financial institutions.

#### **5.1.5. Financial Instrument**

A financial instrument is a tradable asset of any kind; either cash, evidence of an ownership interest in an entity, or a contractual right to receive or deliver cash or another financial instrument. Financial instruments maybe represented by a real or virtual document (such as a check, draft, bond, share, bill of exchange, futures or options contract) representing a legally enforceable (binding) agreement between two or more parties regarding a right to payment of money. Commonly financial instruments are classified as equity based, representing ownership of the asset, or debt based, representing a loan made by an investor to the owner of the asset.

EEFIG draws readers' attention to the fact that this general definition of financial instruments, understood by financial institutions, has specific additional meaning ascribed by the European Commission when used in the context of European Structural and Investment Funds 2014-2020. Financial instruments, in the context of EU Cohesion Policy, specifically refer to those instruments which enable public sector resources to be used in a more efficient way by drawing upon commercial practices and actors and by stimulating the participation of private sector capital.

#### **5.1.6. Multiple Benefits of Energy Efficiency**

Multiple benefits of energy efficiency include the beneficial socioeconomic impacts such as contributing to economic growth and social cohesion as well as the environmental impacts such as reducing air pollution due to the implementation of energy efficiency policies and measures. These impacts come in addition to the energy impacts of energy efficiency policies and measures such as

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<sup>133</sup> European Commission. (2014). *Guidance for Beneficiaries of European Structural and Investment Funds and related EU instruments*. Retrieved from: [http://ec.europa.eu/contracts\\_grants/pdf/synergies\\_beneficiaries\\_en.pdf](http://ec.europa.eu/contracts_grants/pdf/synergies_beneficiaries_en.pdf)

ensuring sustainable energy systems and enhancing energy security and energy services. The overall impacts of energy efficiency are delivered only if energy efficiency policies are embedded in socioeconomic, energy and environmental policies.

### **5.1.7. Project Development Assistance (PDA)**

Project Development Assistance (PDA) is funding provided directly to energy efficiency project promoters (“bottom-up”) for individual projects with the objective to develop and launch specific investments (or investment pipeline). Project Development Assistance provided to project promoters addresses the specific lack of individual project development and structuring skills (including financial structuring) among project developers and can relate to the development of energy audits, optimal organisational set-up (in case of public sector investment projects), business planning, project contractual and financial set-up, establishment of a baseline needed to calculate the targeted energy and financial savings, development of specific energy service contracts and so on. It can include a mandatory leverage factor, e.g. each Euro of PDA funding must lead to €15 in investments.

By definition, such services are intrinsically linked to the individual asset intended for investment and may include a wide range of procedural elements related to project in question. Although the size of the investments can range from small scale to bundled larger-scale investments, the underlying essence of the assistance covered remains similar. Project Development Assistance can be effective when it is provided independently from funding source of the underlying investment costs, as it provides project promoters with flexibility, respecting the market dynamics. However, it is important to ensure that supported services lead to "Investment grade projects" e.g. through establishment of a minimum "multiplication factor".

### **5.1.8. Renovation**

Renovation, as applied to buildings, means the undertaking of structural improvements to increase the energy performance of the building. Renovation differs from refurbishment in that it focuses on the priority delivery of optimal energy performance, whereas refurbishment may improve energy performance but does not normally take into account the full energy savings potential that exists. “Deep renovation” as defined by the Global Buildings Performance Network<sup>134</sup> typically includes a focus on the building shell of existing buildings in order to achieve a very high energy performance – eg. Deeply renovated buildings consume at least 75% less primary energy compared to its state prior to the deep renovation. Very high energy performance for buildings can describe buildings whose energy consumption for heating, cooling, ventilation, hot water and lighting, is less than 60 kWh/m<sup>2</sup>/yr.

### **5.1.9. Small or Medium-sized Enterprise (SME)**

Small or Medium-sized Enterprise (SME) means a micro, small or medium-sized enterprise as defined in Commission Recommendation No 2003/361/EC<sup>4</sup> that: i) is engaged in an economic activity, irrespective of its legal form; ii) employs fewer than 250 people (expressed in annual working units: ‘staff headcount’); and iii) has annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

### **5.1.10. Standardisation**

Standardisation is the process of developing and implementing standards. Standardisation can help to maximize compatibility, repeatability or quality in procedures and documentation and it can facilitate the replicability and scaling of formerly custom processes. Standardisation is a necessary

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<sup>134</sup> GBPN. (2012). *What is a Deep Renovation Definition?*. Retrieved from: <http://www.gbpn.org/reports/what-deep-renovation-definition-0>

corollary of aggregation in reducing transaction costs. For the purpose of EFIG's work, standardisation has application in three areas:

- **Technical standardisation** through the use of similar measures, which simplifies the assessment of investments by financial institutions as well as their preparation and implementation by clients;
- **Standardised processes** to prepare and carry out energy efficiency investments are needed in order to increase the reliability of energy saving cash flows and the ease of their measurement and verification; this stretches from the use of agreed technical standards such as ISO 50002 to standardised technical or legal documentation or joint procurement processes;
- **Standardisation of financial assets**, which means that a number of clauses in the contracts which describe financial assets have to fit a similar framework in order to facilitate the portfolio evaluation of risks and returns associated to groups of projects<sup>135</sup>. Ultimately, standardisation of assets will result from the requirements of (re)financiers<sup>136</sup> to facilitate access to greater pools of capital.

The European Commission financially supports the work of European Standardisation Organisations (ETSI, CEN, CENELEC), but does not interfere with the standardisation setting conducted by industry or National Standardisation Organisations. EU funded research and innovation projects also make their results available to the standardisation work of several standards-setting organisations. Further thinking and consultation, with all interested parties including financial institutions, on how standardisation of Energy Performance Contracts can be beneficial to increasing energy efficiency investments (supply and demand) is important.

#### **5.1.11. Technical Assistance (TA)**

Technical Assistance is funding provided at the Programme level ("top-down") with the objective to design, structure, launch and operate Financial Instruments/ specialist investment vehicles and/or support specific programmes. Technical assistance is usually provided to "programme managers" in Member States or Regions such as Managing authorities, energy efficiency agencies, development banks and so on. Technical assistance is also available to improve and build the capacity of "programme managers" in Member states or Regions such as Managing authorities under ESIF, to conceive, establish and effectively operate Financial Instruments co-funded by ESIF or other public and private funds.

Technical assistance support at the programme level may include the expertise needed for development of ex-ante analyses, the establishment of Investment Funds, operation and management skills (including Fund manager remuneration methods), contractual design and marketing skills related to funders and investors, legal advice or that regarding accounting, budgeting and spending procedures. Increased technical assistance spending should proportionally increase the availability of skilled and motivated professionals at the programme level among the Financial Institutions provided with it.

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<sup>135</sup> In a more comprehensive approach, the Investor Confidence Project Europe is proposing to standardise the whole investment process by defining protocols which will integrate the existing technical standards used at different steps of the building renovation process.

<sup>136</sup> The US mortgage market was standardised after the creation of Fannie Mae which required standard assets in order to refinance them; quoted in Reduce Risk, Increase Clean Energy: How States and Cities are Using Old Finance Tools to Scale Up a New Industry, Clean Energy and Bond Finance Initiative, August 2013.

## 5.2. EFIG Definitions of Key Drivers

During EFIG deliberations on the many drivers of energy efficiency investments, members identified a set of key drivers for buildings and for industry and corporate investments whose importance was indicated in physical meetings and through surveys of EFIG members. These key drivers are listed and defined in the following tables in alphabetic order and separated – where relevant – to reflect a specific importance to one or another of the defined buildings or industrial and commercial sub-segment.

It is interesting to note the EFIG discussion about whether carbon pricing should be included as an explicit driver. In principle a carbon price should improve the attractiveness and create new markets for energy efficient products and technologies and the extent of its impact depends on the sectors covered and the materiality of the carbon price driven value-stream in the context of the whole investment decision. Carbon pricing signals from EU ETS were not included as a driver in the buildings sector analysis as this sector remains outside EU ETS. For industries covered by the EU ETS, the envisaged reforms of the EU ETS<sup>137</sup> may significantly raise the EU ETS carbon price and this may make carbon pricing a stronger driver of energy efficiency investments. However, at current price levels, EFIG industry participants did not feel that carbon prices were a significant driver of energy efficiency investments alone. In both cases, energy prices, regulatory requirements, human capacity, leadership and awareness at key decision making level were deemed stronger drivers of energy efficiency investments.

### 5.2.1. EFIG Definitions of Key Drivers for Buildings EE Investments

Key Driver	Explanation (or Thesis)
<b>Applies to All Buildings Segments</b>	
<b>Availability and use of European Structural and Investment Funds 2014-2020<sup>138</sup></b>	For the 2014-2020 period, about €38 billion of European Structural and Investment Funds have been allocated by the EU Member States and regions to investments that support the shift towards a low-carbon economy in all sectors. Low-carbon economy includes investments in energy efficiency (in public infrastructure, housing and enterprises), renewable energy production and use, smart distribution grids and sustainable urban mobility, as well as research and innovation in these areas, in complementarity with Horizon 2020. Given the scale of additional investment needed in buildings to 2020, it is vital that they are targeted in a smart way that maximizes the leverage of private sector investment. As such, a move away from grants toward the greater use of financial instruments which blend public and private funds to lever and maximize the impact of these funds in accordance with national regulations is important.
<b>Availability of Data<sup>139</sup></b>	That useful data on the key aspects pertaining to energy efficiency investments and their observed performance and track record be made available to prospective energy efficiency investors.

<sup>137</sup> Notably the already adopted changes to the EU ETS up to 2020 (i.e. backloading) and those proposed for post-2020 (i.e. the increase of the annual linear reduction factor from 1.74% to 2.2% and the market stability reserve - MSR).

<sup>138</sup> EFIG notes that the ESIF Operational Programmes are already well developed, however the development of specific financial instruments is very much an on-going matter into 2015 in the context of “off the shelf” models, new EFSI Investment Plan, other public finance initiatives and the implementation of ex-ante assessments required by the ESIF regulations.

<sup>139</sup> Some EFIG members also saw “Availability of Data” as, by definition, included in “Standardisation”.



<p><b>Buildings Regulation, Building Certification and Energy Performance Certificates<sup>140</sup></b></p>	<p>Buildings energy codes within national buildings regulation must support energy efficiency investments in all types of buildings. As such they must be extended from new to existing buildings. Energy performance certificates are mandatory, as specified in EPBD 2010, and they need to be enforced, visible and, through standardization, contain relevant and reliable information (both design and operational) for use in the business case for energy efficiency investments. Easier comparison across countries would facilitate the delivery of a single market for energy efficiency – which in turn would lower transaction costs for businesses.</p>
<p><b>Effective Enforcement of Regulation</b></p>	<p>A strong regulatory framework (building codes, minimum energy performance, etc) and its practical enforcement with effective and material penalties to ensure compliance.</p>
<p><b>Increased Investor Confidence and Changes in Risk Perception</b></p>	<p>At present Investors perceive the risks of investing in energy efficiency to be higher than real estate stakeholders believe is appropriate. Increased investor’s understanding of risks would improve confidence and lead to a greater alignment of the risks perceived and those realized by energy efficiency investments. The accountability of parties along the whole investment chain is needed to build this trust.</p>
<p><b>Leadership and Awareness at Key Decision Maker Level</b></p>	<p>Refers to political leadership but also leadership within the public and private sectors. Both in the public and private sector energy costs are often monitored and managed by professionals without access to the top leadership teams. As such the impact of rising energy costs may not be discussed at a level senior enough to consider multi-annual investments in energy efficiency to address these impacts. There is a need for public and private sector leaders to have a greater awareness of the potential for energy efficiency to offset rising energy prices. In addition, where a strong business case is identified and investments follow, these should be publicized to further catalyse awareness.</p>
<p><b>Lenders’ approach to energy efficiency investment risk (Recourse vs Non-Recourse Loans)</b></p>	<p>That lenders of finance for energy efficiency building refurbishments consider the economic benefits (derived substantially through reduced energy bills and increased asset value – if realizable) of such investment and asset improvement, rather than only look at the general creditworthiness of the building owner in its assessment of risk.</p>
<p><b>Measurement, Reporting &amp; Verification and Quality Assurance</b></p>	<p>Energy efficiency investments, building renovation and the resulting or attainable energy savings to be measured, reported on and verified in a standardized, clear, transparent and high quality manner (eg. IPMVP method) and for these quality standards to be assured.</p>
<p><b>Regulatory Stability</b></p>	<p>Returns on energy efficiency investment may be delivered over long time-periods (up to 25 years)._ It is vital that investors have confidence that there is a robust, stable and consistent regulatory framework underpinning energy efficiency investments, their finance and that their returns as stable over the timeframe of those investments (incl. ownership of assets)..</p>
<p><b>Risk-Return Targets</b></p>	<p>That the target level of returns required for energy efficiency investments in buildings should more accurately reflect the levels of risk implicit in the investment. Including: tangible energy savings, positive impact to investment performance and other benefits such as consistent mortgage repayments.</p>

<sup>140</sup> Article 2(12) of Directive 2010/31/EU on the Energy Performance of Buildings establishes that ‘energy performance certificate’ means a certificate recognised by a Member State or by a legal person designated by it, which indicates the energy performance of a building or building unit, calculated according to a methodology adopted in accordance with Article 3’ of the Directive. See Glossary of Terms.



<p><b>Simplicity and Transaction Costs</b></p>	<p>That investment procedures, data availability and standards reduce the perceived complexity of energy efficiency investments and in so doing make them simpler and straightforward to execute, finance and to reduce their transaction costs.</p>
<p><b>Standardization</b></p>	<p>The availability, adoption and common usage of an accepted set of standards for key aspects of the energy efficiency investment process. They are related to how energy savings are measured, reported and verified (to allow comparison between projects and between countries) and related to the legal structuring of contracts (to allow bundling of contracts to facilitating aggregation of investments). They include:</p> <ul style="list-style-type: none"> <li>• For Governments: Comparable and “open-source” methodologies for calculating the energy saving impacts of policies (including the future energy price assumptions used); Clear and replicable methodologies for developing national Energy Performance Certificates;</li> <li>• For business and financiers: Use of harmonised approaches to data collection; Use of harmonised approaches to developing metrics for baseline estimations of energy use as well as measurement, verification and reporting on energy savings achieved. Different methodologies may be needed for different sectors. Use of standardised legal structures used for Energy Performance Contracting and other forms of energy efficiency finance contracts.</li> </ul> <p>These standards should be “open source” and establish a common vocabulary and shared knowledge between stakeholders and financial institutions to overcome market failures.</p>
<p><b>Mainly Applying to Commercial Buildings</b></p>	
<p><b>Clear Business Case for Energy Efficiency</b></p>	<p>A well-articulated business case for an energy efficient building renovation backed by financial modelling that shows the investment delivers sufficient risk adjusted returns over the timeframe required by the public and/or private investor. The hurdle rate will differ depending on whether the investor is private (and uses a commercial discount rate) or public (and so may use a social discount rate). If relevant, increased building lifetime, other material non-energy benefits and the additional costs associated with alternative routes should be included.</p>
<p><b>Mainly Applying to Public Buildings</b></p>	
<p><b>Facilitation and Technical Assistance</b></p>	<p>Municipalities and regions are in a position to potentially develop large area-based renovation schemes and, as such, develop a pipeline of projects for financing. They are constrained by a lack of technical expertise to be able to identify and develop projects. They are also constrained by a lack of financial resources to pay for the costs of such expertise in order to develop financeable business plans. Feasibility studies may also be required, the upfront costs of which similarly need financing before projects can move to development.</p>
<p><b>Rules on Public Authority Procurement, Accounting, Energy Disclosure and Reporting</b></p>	<p>Current rules on public procurement rules are onerous and create barriers to investment including obstacles to private energy-efficiency services in the public sector. Efforts are needed to streamline this process. In addition public sector accounting rules currently record the cost but not the benefit of investment. With the capacity of the public sector to take on debt constrained anyway, this limits the opportunities for many investment to go ahead. Interpretations of rules on public debt and deficit by EUROSTAT should not impede development of energy-efficiency services and support transparent energy disclosure.</p>

<b>Mainly Applying to Private Residential Buildings</b>	
<b>Behavioural Economics</b>	The recognition that decision makers are not always economically rational and that consumers in particular have a range of priorities and preferences that affect how they allocate capital. As such, decisions about undertaking energy efficiency investments will depend on other factors in addition to the economic case, such as how effective marketing material is; peer pressure what neighbours, friends and family do; perception of other value components accruing from buildings renovation – such as comfort, health benefits, modernization of properties among others.
<b>Fiscal Support</b>	For investments in highly energy efficient building renovation to provide the investor a fiscal benefit (such as full or partial tax deductibility), to be adjusted based on the ambition of the retrofit and the resulting energy savings.
<b>Individual Homeowner's Repayment Capacity</b>	House incomes vary widely between and within countries. Given the upfront costs of energy efficiency renovation this can suppress demand. This is particularly the case for lower income countries as a whole and households. As such there needs to be a focus on addressing upfront costs for example through loans. For those who are able to pay for renovation, loans must be affordable as part of monthly outgoings. Future energy bill reductions due to energy efficiency investments should be factored into these calculations but in some cases may not cover the full cost of loan repayment. In this scenario consideration is needed by governments on whether additional financial or regulatory measures are needed to address this shortfall and incentivize investment. Without this demand will be suppressed.
<b>On-bill financing Mechanism</b>	That repayments for energy efficiency investments are made within an existing, robust and well-functioning payment system such as that used by utilities to collect energy payments or that used by the public administration to collect taxes. Examples are the PACE system in the US and Green Deal in the UK.
<b>Tailored Financial Product Availability</b>	Energy efficiency investments have unique characteristics. They are not repaid via clearly identified receivables, there may be uncertainty over the predictability of revenue streams, and using on bill financing they may not be linked to a single identified individual or legal entity. Therefore particular financial products must be created and promoted specifically for the purpose of energy efficiency investments that address these issues and stimulate and match demand.

### 5.2.2. *EEFIG Definitions of Key Drivers for Corporate EE Investments*

<b>Key Driver</b>	<b>Explanation (or Thesis)</b>
<b>Appropriate Resourcing for EE (at Financial Institutions = Supply Side)</b>	<p><b>Funder consciously dedicates appropriate resources to EE investment and technology opportunity development to build knowledge for its key sectors, officers and finance channels or outsources this expertise and external trusted experts work with the bank/loan officers.</b></p> <p>Financial Institutions need to invest in resources to develop specialist assessment skills for EE. The lack of the right resources to deliver well trained, technically proficient EE investment managers means that EE investment proposals are not understood or taken seriously.</p>
<b>Appropriate Resourcing for EE (Demand Side)</b>	<p><b>Company consciously dedicates appropriate resources to EE opportunity development and investment (eg. ISO 50001).</b></p> <p>In absence of adequate resources EE investments are not taken seriously.</p>

<p><b>Awareness at Key Decision Maker Level &amp; Leadership and Human Capacity</b></p>	<p><b>A broad awareness and willingness to lead, at key decision maker level on the economic and environmental benefits of energy efficiency due to a thorough understanding of what energy efficiency means for the Financial Institution and its client.</b></p> <p>There is a lack of awareness of the opportunities for and benefits of energy efficiency projects at key decision making level within Financial Institutions and their clients.</p>
<p><b>Awareness of Funding Sources/ Tailored Financial Products</b></p>	<p><b>Company is fully aware and confident that appropriate funds for EE projects are available.</b></p> <p>Thesis: Demand for EE Investment is intimately linked to the supply of appropriate finance products as sector stakeholders, installers and project developers (large and small) will not invest their resources to build an EE investment pipeline until they are confident that appropriate financing product offering exists. In countries where the supply of finance for EE measures is lacking, or very hard/ complex to access, there is low investment in project development and therefore lower demand.</p>
<p><b>Availability of Performance Data and Clear/ Transparent Monitoring and Measurement of Savings vs Baseline</b></p>	<p><b>Transparency and Data Availability on different aspects relating to energy efficiency investment projects (sector, financing terms, energy savings and multiple benefits) is a powerful driver for the supply of investment capital.</b></p> <p>The supply-side driver includes tracking investment performance at project level and issues relating to monitoring and tracking baselines. The levels and transparency of data available in many Member States is insufficient for funders to confidently prioritise EE investments in industry to and to make more attractive commercial investment proposals to company owners and managers. Measures can be taken to improve this through greater focus and support to resolving information and MRV concerns of Financial Institutions.</p>
<p><b>Banking Regulations</b></p>	<p><b>Banking regulations (Basel III) make long-term corporate EE investments more capital intensive for banks, review of these regulations in support of EE would spur EE investment supply (eg. Green lending in China).</b></p> <p>Banking regulations have a greater overall impact on banks interest to invest in Industry/ SMEs for the time-periods and investment types which EE represents than project specific elements.</p>
<p><b>Binding EE Targets</b></p>	<p><b>Binding MS-level EE targets<sup>141</sup> will drive EE investments.</b></p> <p>Thesis: That high-level ambition (at MS level), together with appropriate public support, will create investment frameworks which drive corporate engagement and demand for EE investments (eg. Article 18 of EED).</p>
<p><b>Capacity Building for Financial Institutions</b></p>	<p><b>Capacity Building can train energy efficiency experts within Financial Institutions to both advise clients on how to finance investments in EE measures and to give Financial Institutions the confidence to assess the risks and benefits of business cases presented to them.</b></p> <p>Capacity building provided to Financial Institutions must have positive impacts on their willingness to provide greater amounts of development resource and offer tailor made, innovative financing products for energy efficiency investments to the</p>

<sup>141</sup> Notwithstanding the European Council (October 2014) agreement on a 2030 indicative energy efficiency target (i.e. of at least 27%) set at EU-level and the fact that the text of the Conclusions of that meeting propose coherence with the RES EU-wide target and, in this respect, specifically mention that the EE target will not be translated into nationally binding targets, EEFIG wished to note that this was an option considered in its analysis.

	market. Potentially more relevant outside EU-15.
<b>Clear Business Case and Baseline</b>	<p><b>A well-articulated business case backed by financial modelling and containing all relevant information (the "body of evidence") shows that the investment delivers sufficient risk adjusted returns over the timeframe required by the investor. Baseline energy consumption is easily identified (process-level metering) and can be independently measured.</b></p> <p>Thesis: Corporate managers suggest that often the EE investment case is unclear with complexities around the baseline energy (critical for Energy Performance Contract and ESCO engagements) and also hard to independently monitor and verify leaving contracts hard to enforce.</p>
<b>Concentration Limits for Individual Lenders/ Availability of co-financing Options</b>	<p><b>Financial Institutions and EE funders are constrained by risk exposure limits at an individual corporate level and at an overall portfolio management level for EE investments.</b></p> <p>Co-financing and/ or relaxation of concentration limits (resulting from improved perception of the risks) will increase the supply of EE investment capital. Sectoral or regional availability of funds can be a significant driver of Financial Institution investment appetite. Availability of funds and appetite to invest in regions and sectors where EE investments are highly attractive is a critical and necessary precondition of large investment supply.</p>
<b>Corporate Debt Capacity</b>	<p><b>Capacity of the company to increase its level of indebtedness.</b></p> <p>Companies in many MS are relatively highly indebted, or constrained by ratings criteria, and do not have the capacity, or are unwilling, to increase indebtedness limiting their EE investment appetite.</p>
<b>Development of Easy-to-Use Standards for All Steps in EE Investment Process</b>	<p><b>Easy-to-Use Standards are developed for Corporate EE investments by sector which cover elements such as: Contracts, Project data for financial due diligence, baselines, performance measurement and reporting data.</b></p> <p>The availability of a widely accepted set of standards for many aspects of EE investment process would significantly add to the supply of EE investment funds through additional market participants and ease of access to refinancing options, among others.</p>
<b>EE Investment Returns</b>	<p><b>EE investments have risk-adjusted investment returns which exceed internal investment hurdles.</b></p> <p>EE investments (in many companies) are only undertaken if the energy payback period is below 2-4 years. This places a relatively high hurdle rate, and rather arbitrary, barrier for EE investments versus other investment types.</p>
<b>EE's Rank among Internal Investment Priorities</b>	<p><b>EE Investments are ranked as "strategic" alongside other core internal investment priorities.</b></p> <p>If EE investments are not seen as "important" (or "strategic") then they constantly fall off the agenda and/ or are pushed to cost centres that are ill-equipped to manage them (or under resourced).</p>
<b>Effective enforcement of existing Regulation</b>	<p><b>Stricter enforcement of current industrial and SME regulations together with the Energy Efficiency Directive would drive demand for energy efficiency measures.</b></p> <p>Thesis: Implicit understanding that existing regulation of Industry and SMEs in the</p>

	<p>area of EE, Energy and Resource Use are under-enforced, therefore greater enforcement would drive more EE investments. A high quality transposition of the Energy Efficiency obligations under articles 7 and 14 of the Energy Efficiency Directive, together with awareness raising and access to appropriate funding, including through pipeline development assistance funding, will support EE in industries and SMEs.</p>
<p><b>Existence of Public Incentives for EE Projects (Demand Side)</b></p>	<p><b>EU, public financial institution or national incentives/ grants are available to contribute towards (in part or fully): feasibility study (inc. audit), initial investment and ongoing operating costs of EE projects.</b></p> <p>Public incentives will improve EE returns to the company can reduce certain (financial) risks and raise the visibility of EE opportunities at Executive Board level to drive action,</p>
<p><b>Existence of Public Incentives for EE Projects (Supply Side)</b></p>	<p><b>Availability of public subsidy for EE investments, in particular for SMEs.</b></p> <p>Thesis: Public subsidy will improve EE returns to company and remove some risks and therefore increase Financial Institutions interest to invest in EE in this company.</p>
<p><b>Existence of Soft Loan or Public Co-Finance</b></p>	<p><b>Soft loans (debt from public bodies and public financial institutions at below market rates of interest and/or concessions on repayment terms) and Co-financing (joint or parallel funding of debt and equity by private investors and commercial banks together with public bodies and public financial institutions (EU &amp; MS)) are available for EE investments.</b></p> <p>It is assumed that soft loan programmes and/ or public co-finance will improve EE returns to company and remove certain (financial) risks.</p>
<p><b>Finance Providers' approach based on Project Cash Flow rather than Company Balance Sheet based</b></p>	<p><b>When assessing credit proposals for EE investments, Financial Institutions should positively factor-in the project level cash flow resulting from energy cost savings and not only focus on the effect of an immediate increase in balance sheet debt/ leverage.</b></p> <p>Thesis: EE Investments have well-known positive cash-flow and competitive impacts resulting from delivered energy cost savings. This can justify an increase in debt and loans with longer maturities without adversely affecting Financial Institution's perception of the overall corporate credit rating of the company. Whereas, an increase in external debt funding for general corporate purposes would be perceived as increasing corporate credit risk.</p>
<p><b>Financial Support for Project Development Assistance</b></p>	<p><b>Financial support for Project Development Assistance ("PDA" including where necessary Energy Audits) and Facilitation would help to set up energy efficiency projects and enhance transparency of the economic impacts of energy efficiency projects and hence help identify a clear business case.</b></p> <p>Financial Support for Project Development Assistance could be provided in the form of resources / consultants made available to project promoters to help to develop and launch energy efficiency projects. Facilitation/ PDA is an important contribution to open-up new market segments. EEFIG considers that PDA support will stimulate the demand for EE investments.</p>
<p><b>General Economic Outlook</b></p>	<p><b>Overall outlook for the host company's sector, industry and geographical region's economic performance supports investment supply.</b></p> <p>Thesis: Lack of confidence in the general economic future (i.e. concern around lack of demand in the economy) inhibits EE investment supply.</p>



<p><b>Improved Counterparty Risk</b></p>	<p><b>Where third parties provide services (eg. implementation of EE measures and continuing performance guarantees) or payments (eg. ESCOs and project finance to special purpose companies), the company and financial institutions also undertake a risk assessment of the ability of all parties to perform their role over the funding period.</b></p> <p>Thesis: EE investment or lending decisions are often based on the credit strength and operational capacity of the weakest counterparty involved (often the Energy Performance Contract provider) which is a conservative approach due to the newness of the market.</p>
<p><b>Industry or Sector Risk</b></p>	<p><b>The assessment or credit rating of Industry or Business Sector is positive.</b></p> <p>It is assumed that EE investment supply is constrained/ prevented by a negative economic outlook for the industry or business sector of the client company.</p>
<p><b>Key Decision Makers' Confidence in EE Resources (at Financial Institutions = Supply Side)</b></p>	<p><b>Key Financial Institution investment decision makers have confidence in those (internal &amp; external parties) presenting the business case and implementing EE investments in the company.</b></p> <p>EEFIG Members suggested that funders may mistrust the quality of the EE resources (internal or external) or their motives and therefore highly discount or doesn't pursue EE projects.</p>
<p><b>Key Decision Makers' Confidence in EE Resources (Demand Side)</b></p>	<p><b>Key corporate decision makers have confidence in those (internal &amp; external champions) presenting the business case and implementing EE investments in the company.</b></p> <p>EEFIG Members suggested that Senior Management can mistrust the motives, quality of, and arguments presented by the internal and external proponents of EE investments and therefore highly discount or ignore EE projects<sup>142</sup>.</p>
<p><b>Knowledge of EE Technologies and Necessary Skills to Assess EE Investments (Supply Side)</b></p>	<p><b>Funder (or third party commissioned by funder) builds key knowledge of EE technologies and develops staff skills to assess EE investments and develop a pipeline of customer opportunities.</b></p> <p>An absence of well trained, technically proficient EE investment managers means that EE investment proposals are not understood or taken seriously by Financial Institutions, who also need to significantly increase specialist assessment skills.</p>
<p><b>Knowledge of EE Technologies and Practices (Demand Side)</b></p>	<p><b>Company has researched and understands potential EE technologies, practices and data/ information on these technologies and practices are easily available and cross-checkable.</b></p> <p>If company is unaware of or uncertain of new EE technologies and practices its chances of investing in EE are lower – Energy audits seek to address this.</p>
<p><b>Increased Investor Confidence and Changes in Risk Perception of EE Asset Class</b></p>	<p><b>An improved investor confidence in energy efficiency investments, based on common standards and a track record of investment success in the market, gives investors a greater appetite for energy efficiency risk and hence greater EE investment supply.</b></p> <p>Third party investor appetite and concern for risk is a key driver of Financial Institution's appetite for business and asset development in specific segments. If third party investors and the capital market's confidence in EE investment projects and measures changed for the positive this would be a strong supply driver.</p>

<sup>142</sup> EEFIG participants note that there are many solutions to this: Certification, standardization, independent energy experts are working examples of these in Germany, Netherlands, UK, Japan, USA.



<p><b>Increased Non-Bank Financing Options</b></p>	<p><b>Increased availability of non-bank finance alternatives (eg. Capital Markets, Bonds, Direct Pension Fund, "Green Bond", ESCOs, tailored ESG vehicles and other sources) will materially impact EE investment supply and reduce the need for banks to be involved.</b></p> <p>It is assumed that the need for the involvement of banks in EE investing is a key hurdle and if there were more non-bank players with attractive EE investment funding offers this would unlock increasing EE investment supply.</p>
<p><b>Limited Business Interruption Risk</b></p>	<p><b>EE investment execution is "built-in" and has limited and easily manageable business interruption risks and that process changes can take place within an acceptable and "normal" production process downtime schedule.</b></p> <p>Perceived high levels of business process interruption is one of the KEY "hidden costs" as identified and singled out by EFIG members (only for core process investments – and not, say, for the 10% of the EU's uninsulated industrial buildings<sup>143</sup>).</p>
<p><b>Mainstreaming of EE Focus within Industrial Lending and Investment</b></p>	<p><b>Companies and Financial Institutions see EE investing as part of "business as usual" industrial investment or lending activity - the commercial value and related risks of EE investments are clearly understood and can be evaluated against standard investment or lending criteria.</b></p> <p>By implication EE brought into the natural core industrial/ SME finance business cycle and not seen as stand-alone investment activity (good example = EBRD). If EE investments are seen as a "special case" or "ancillary" (implication "more complex", "abnormal" or "more risky") or (worse) not seen at all, then incidence of EE investing will be less.</p>
<p><b>Mandatory Energy Audits with Summary for Key Decision Makers</b></p>	<p><b>Periodic Energy Audits (like those mandated for large enterprises in Art 8 of EED) are required together with an articulate summary of their conclusions and possible actions for key decision makers at Executive Board level. The obligation to undertake a comprehensive energy audit is seen as a key driver of demand for finance.</b></p> <p>An energy audit means an inspection, survey and analysis of the energy flows in a site/ process carried out with the objective to reduce the amount of its energy inputs. Energy audits are foreseen under the EED (Art. 8) for large corporates, but remain voluntary for SMEs. Their effectiveness can depend upon how (and if) the results are well summarised for key decision makers at Executive Board level.</p>
<p><b>Mandatory Integration of Energy Management Systems</b></p>	<p><b>Energy Management Systems (EnMS) that are relevant for each industry segment are made mandatory for significant energy consumers.</b></p> <p>Thesis: EnMS are an important tool to unlock real EE investment opportunities inside companies and that unless made mandatory EE progress will lag.</p>
<p><b>Off-Balance Sheet Alternatives (ESCO, Lease &amp; Insurance Solutions...)</b></p>	<p><b>An off-balance sheet finance structure allows a company to benefit from an EE measure without having to account for the asset and a corresponding increase in on-balance sheet debt finance and/or a method to transfer risk to those parties better able to manage it. There is a choice of different off-balance sheet methods to fund EE investments and there emerging insurance solutions available to mitigate risks/uncertainties in relation to the energy cost savings achieved with an energy efficiency investment.</b></p> <p>Thesis: Off-balance sheet methods to fund EE investments will help companies sensitive to levels of indebtedness and/ or keen to ensure that third parties fully</p>

<sup>143</sup> Ecofys. (2012). *Climate protection with rapid payback Energy and emissions savings potential of industrial insulation in EU27*. Retrieved from: [http://www.eiif.org/awm/downloads/EU-Study\\_ClimateProtectionWithRapidPayback.pdf](http://www.eiif.org/awm/downloads/EU-Study_ClimateProtectionWithRapidPayback.pdf)

	bear appropriate risks. The availability of insurance solutions to mitigate risks in relation to the scope of energy cost savings will support investment decisions.
<b>Overall Supply of Long-term Finance</b>	<b>Increased availability of long-term finance would positively impact the supply of EE investments.</b> The overall limitation of long-term finance in the EU limits EE investment supply.
<b>Price and Volatility of Energy</b>	<b>Company expectation of long term increasing energy prices and short-term price shocks (spikes).</b> If energy prices go up and become more volatile economic growth is impacted <sup>144</sup> and companies making energy efficiency investments will gain in market-share as a result of their comparative insulation from these impacts, especially the more energy intensive.
<b>Regulatory Stability</b>	<b>The regulatory framework covering EE investments in Industry/ SMEs remains stable and predictable for the term of the EE investments needed.</b> If the expected regulatory volatility and the likelihood of regulatory changes that impact EE investments are perceived as low then EE investment supply will grow.
<b>Technology Risk</b>	<b>EE investments involve proven and well understood technologies therefore limiting under-performance risk.</b> Thesis: If EE Investments are seen to involve cutting-edge technologies from unknown providers with little or no track record, it will reduce Financial Institution appetite to supply investment funds (or increase their cost) because of the lack of track record in savings delivery (unless insurance available).
<b>Use of ISO 50001/ Energy Management System</b>	<b>Company implements ISO 50001 or equivalent Energy Management System.</b> ISO 50001/ EnMS require integrated approach to Energy Management (at all levels, including key board decision maker engagement) and provide framework for firm to optimise EE investments <sup>145</sup> (mainly for large industrial companies many of which with a strategic approach to energy management may reduce their energy use by up to 40 % <sup>146</sup> ).

<sup>144</sup> Ebrahim, Z., Inderwildi, O. R., & King, D. A. (2014). Macroeconomic impacts of oil price volatility: mitigation and resilience. DOI 10.1007/s11708-014-0300-3. Retrieved from: <http://www.smithschool.ox.ac.uk/news/FEP-14003-EZ-proof-checked.pdf>

<sup>145</sup> EnMS and ISO 50001's success in stimulating energy efficiency and reducing corporate energy use illustrated by Institute of Industrial Productivity's April 2013 memo to the Clean Energy Ministerial entitled "Large-scale adoption of energy management systems: global energy efficiency programme insights". Please see below:

Institute for Industrial Productivity. (2013). *Large-scale adoption of energy management systems: global energy efficiency programme insights*. Retrieved from: [http://www.iipnetwork.org/EnMS\\_10pager\\_memo.pdf](http://www.iipnetwork.org/EnMS_10pager_memo.pdf)

<sup>146</sup> Thollander, P., Palm J. (2012). "Improving energy efficiency in industrial energy systems: An interdisciplinary perspective on barriers, energy audits, energy management, policies & programs". London: Springer. Retrieved from: <http://serverlib.moe.gov.ir/documents/10157/42675/Improving+Energy+Efficiency+in+Industrial+Energy+Systems.pdf>

### 5.3. EEFIG Assessment of Selected Financial Instruments

Certain financial instruments and case studies were raised frequently during EEFIG discussions. This section identifies some selected existing and emerging financial instruments, with best practice examples, and reviews their sectoral applicability as well as certain key benefits and challenges which they face. EEFIG sees these financial instruments as being among those likely to fill the energy efficiency investment gap and offers this list as guidance as to the group’s thinking and to focus its subsequent conclusions.

#### 5.3.1. Existing Financial Instruments

##### 5.3.1.1. Dedicated Credit Lines

Dedicated credit lines (or soft loans) are a mechanism where public funding decreases the cost of energy efficiency building renovation loans and provides concessions on terms, such as repayment periods. The impact and relative success of dedicated credit lines can also be attributed to their retail distribution through networks of private banks.

<b>Dedicated Credit Lines</b>	
<b>Best practice examples</b>	<ul style="list-style-type: none"> <li>- Numerous for buildings: KfW, NRW.BANK, Kredex, etc.</li> <li>- For SMEs and industry: BPI France’s Green Loan (2010-2013) and eco-energy loan (2014)<sup>147</sup>, KfW Energy efficiency programme, EBRD Sustainable Energy Finance Facilities (SEFF), OP PIK (CZ)</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Easy to roll out, however careful ex-ante analysis of supply and demand and legal/tax framework needed</li> <li>- Leverage effect of public funds is usually between 4 and 10 which is higher than traditional grants</li> <li>- Standardised supply offering at the same time flexibility according to individual preferences (repayment, interest rate fixation etc.)</li> <li>- The use of Cohesion funds for soft loans in housing is facilitated with the “renovation loan” (off-the shelf instrument)</li> <li>- Allows 1:1 refinance to commercial banks (Basel III compliant)</li> <li>- Positive impact on public budgets<sup>148</sup></li> <li>- Allows raising the ambition of the investment in terms of energy savings (e. g. by combining the loan with a grant component)</li> <li>- Can be used for ambitious renovation / refurbishing project as well as for individual measures: large flexibility</li> <li>- Usually offers longer duration than commercial loans</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Capacity/ willingness of owners to take more debt (ie very country dependent)</li> <li>- Risk aversion of banks (calling for guarantees from Governments)</li> <li>- Often complicated, time consuming and static application processes which act as a hurdle for projects</li> <li>- Loans often require the additional implementation of costly non-energy related measures which change project characteristics</li> </ul>

<sup>147</sup> BPIFrance. (2015). *Le Prêt Éco-Énergie, pour améliorer votre efficacité énergétique*. [Website]. Retrieved from : <http://www.pee.bpifrance.fr>

<sup>148</sup> Kuckshinrichs et al. (2012), STE Research Report, Wirkungen der Förderprogramme “Energieeffizientes Bauen”, “Energieeffizient Sanieren” und “Energieeffiziente Infrastruktur” der KfW auf öffentliche Haushalte: Förderjahr 2011, FZ Jülich. Retrieved from: [https://www.kfw.de/KfW-Konzern/Service/Download-Center/Konzernthemen-\(D\)/Research/Evaluationen/Evaluationen-Energieeffizient-Bauen-und-Sanieren/#](https://www.kfw.de/KfW-Konzern/Service/Download-Center/Konzernthemen-(D)/Research/Evaluationen/Evaluationen-Energieeffizient-Bauen-und-Sanieren/#)

<b>Dedicated Credit Lines</b>	
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Transaction costs to implement (technically) and manage long-term programs within financing institutions</li> <li>- Increased regulations / provisions for (promotional) banks hinder commitments of credit lines (EBA-supervisory, State-Aid-rules....)</li> </ul>
<b>What is needed to roll out the instrument at a larger scale</b>	<ul style="list-style-type: none"> <li>- Comprehensive framework, e. g. including energy audits and independent expert advice</li> <li>- Large network of on-lending banks and equal conditions for all</li> <li>- Long term horizon and stability</li> <li>- A set of criteria that can easily be understood, processed and checked (MRV), possibly using software instruments.</li> <li>- An effective information strategy directed towards the final beneficiaries.</li> <li>- Greater involvement with Energy Performance Contract providers in selected sub-sectors.</li> </ul>

### 5.3.1.2. Risk-sharing Facilities

Risk-sharing facilities (Guarantee funds and First-loss Facilities) reduce the risks for banks and equity investors by covering part of the risk of payment default – either through a guarantee or first-loss absorption. They can be combined with dedicated credit lines and are a key instrument to grow the amount of bank lending to energy efficiency renovation.

<b>Risk-sharing facilities (Guarantee funds and First-loss Facilities)</b>	
<b>Best practice examples</b>	<ul style="list-style-type: none"> <li>- IFC's CEEF programme (Hungary, Czech Republic, Estonia, Latvia, Lithuania and Slovakia)</li> <li>- Energy Efficiency and Renewable Sources Fund (EERSF) in Bulgaria, targeting ESCOs<sup>149</sup></li> <li>- Several Promotional Programs for commercial entities in Germany (e.g. NRW.BANK Mittelstandskredit mit Haftungsfreistellung)</li> <li>- European Energy Efficiency Fund (EEEF)</li> <li>- EIB's PF4EE guarantee scheme</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Reduces the risks for banks and enables them to lend greater amounts</li> <li>- Anecdotal evidence suggests that energy efficiency loans experience “market standard” or better credit performance therefore risk sharing facilities can be a transition phase until energy efficiency loans are mainstreamed</li> <li>- Provides extra leverage for private sector funds</li> <li>- Potential to boost energy efficiency services market in EU</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Time to structure and negotiate</li> <li>- Moral hazard if substantially all risk is removed from bank lending</li> <li>- Know-how to implement at regional and local government levels</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Often extensive and complex handling of risk-sharing facilities at EU level (“red tape”) especially for smaller financial intermediaries and first-time users</li> </ul>

<sup>149</sup> EERSF also proposes an EPC portfolio guarantee, which covers the risk of late payment from EPC clients, up to 5% of the total portfolio; whereas payment defaults on an EPC are very rare, delayed payments are more frequent and can be quite dangerous for a small and medium enterprise.

<b>Risk-sharing facilities (Guarantee funds and First-loss Facilities)</b>	
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Template approach to execution of risk-sharing facilities using ESIF 2014-2020</li> <li>- Consensus view as to at what stage and for what market segments this Financial Instrument is most useful and pressure by EU public financial institutions to develop faster in those identified segments and Member States</li> <li>- Greater degree of collaboration/ resource commitment on the design and implementation of these instruments by private and public sector Financial Institutions</li> <li>- Further consideration of the role public guarantees might play in support of the energy efficiency services markets</li> </ul>

### 5.3.1.3. Subordinated Loan

EEFIG participants felt that there is room for an instrument which sits between a grant and a direct credit line, with aspects of loss-absorption like a first-loss facility, in the form of a subordinated loan. Very simply, a subordinated loan would be of junior rank in the case of bankruptcy or liquidation and its interest repayments are made after all of the holders of more senior debt are paid. EEFIG felt that it is a widely used instrument which may be very useful for those countries that need to move away from a grant dependant environment, where what would have been a grant becomes a long-dated, low interest subordinated loan.

<b>Subordinated Loan</b>	
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Leveraging private bank funds (i.e. for every euro of grant the bank is obliged to added its equivalent euro of private funding thereby multiplying the size of the fund with private funds)</li> <li>- Reducing the interest paid</li> <li>- Increasing the term of the financial package</li> <li>- Reducing default risks for the senior lenders</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Time to structure and negotiate</li> <li>- Moral hazard if substantially all risk is removed from bank lending</li> <li>- Know-how to implement at regional and local government levels</li> <li>- New application of “old technology” requires adjustment period</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- State Aid rules: The subordinated loan is different from a strictly “market rate loan”. The value of aid in Euros can be calculated through the different interest rates charged between the market based loan and the subordinated loan</li> <li>- Lack of “Best practice examples”</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Trial instrument work-group containing key public and private operators in target Member State to design and implement the structure</li> </ul>



### 5.3.1.4. Covered Bonds

Covered bonds are corporate bonds backed by a pool of assets (e.g. energy efficiency loans) which remain on the balance sheet of the issuer, but are used as a collateral to secure the cash flows of the bond. In case of default, the investor has a recourse both against the issuer and the collateral. Moreover, the asset pool is dynamic meaning that non-performing assets have to be replaced.

Covered bonds are a well-established instrument for banks to access cheap capital. They are regulated by national legislations in each EU Member State, which ensures that they get very high credit rating. They are also attractive to investors because they are classified as low-risk and the capital requirements under Solvency 2 and Basel III are lower.

The inclusion of energy efficiency in covered bonds could be through specific energy efficiency assets (EE loans) or through the mainstreaming of energy efficiency in standard covered bonds (increasing and reporting on the share of the bond which is dedicated to energy efficiency), which could attract more interest from investors looking for specific SRI criteria.

<b>Covered Bonds</b>	
<b>Best practice examples</b>	- Munchener Hyp ESG covered bond for co-operative housing <sup>150</sup>
<b>Advantages</b>	- Provides cheap capital for banks - Lower capital requirements for investors than standard bonds - Covered bonds are a solid and well established legal framework which allow access to capital at a lower cost
<b>Weaknesses</b>	- The average size of a covered bond is usually around EUR 0.5 to 1bn, but smaller bonds can also be issued, down to EUR 150m - On balance sheet for most covered bonds - Present collateral requirements need to recognise solidity of energy savings (e.g. the building needed not just the cash flows of energy savings)
<b>Main obstacles to the instrument</b>	- Lack of experience of investors in "energy efficiency loans" - Legal framework at national level need to be clarified regarding the inclusion of energy efficiency - Lack of clear definition of "green covered bond"
<b>What is needed to roll-out the instrument at larger scale</b>	- Scale portfolios of energy efficiency loans on banks' balance sheets which can be used as covered assets - Agreement among market players on what to include in energy efficiency covered bonds - Co-ordination with stakeholders at national level to define what types of energy efficiency assets can be included and how - At the European level, recognition of the relevance of energy efficiency for covered bonds

<sup>150</sup> MunchenerHyp. (2014). *Press Release: Capital market premiere: MünchenerHyp issues the first sustainable Mortgage Pfandbrief*. Retrieved from: [http://www.muenchenerhyp.de/en/\\_downloads/press/releases14/Press\\_Release\\_MuenchenerHyp\\_ESG\\_Pfandbrief.pdf](http://www.muenchenerhyp.de/en/_downloads/press/releases14/Press_Release_MuenchenerHyp_ESG_Pfandbrief.pdf)

### 5.3.1.5. Direct and Equity Investments in Real Estate and Infrastructure Funds

Real Estate and Infrastructure funds already provide a large amount of ‘invisible’ energy efficiency investment in the building sector. This investment takes place during a fund’s investment life cycle, new developments, renovation, planned and preventive maintenance and active building management. Real Estate investment funds are a key channel to scale up finance in energy efficiency in buildings, both through increased equity investments in the funds and through increased fund activity in energy efficiency, where it can be facilitated by strong regulatory and market frameworks.

According to the 2013 Global Real Estate Sustainability Benchmark survey (GRESB)<sup>151</sup>, 70% of its participants, managing US\$ 1.6 trillion gross assets, have an Environmental Management System in place, which on average covers 77% of their portfolios. EFIG members have noted the emergence of new dedicated Sustainable Real Estate Funds whose strict application of socially responsible investment criteria and potential focus on best-in class energy performance buildings can support market transformation. However their size tend to be small and they tend to focus on new build.

<b>Real Estate and Infrastructure Funds</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- Numerous: Listed and unlisted real estate investment fund</li> <li>- Real Estate companies</li> <li>- Infrastructure funds.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Existing instruments well established existing instruments across the EU</li> <li>- High leverage effect</li> <li>- Limits need for public funding</li> <li>- Rewarding companies’ efforts to reduce their assets’ obsolescence risks by investing in best performers</li> <li>- Sustainability and environmental criteria can be embedded as part of company’s due diligence and valuation process</li> <li>- Fund managers can influence companies’ environmental policies in relation to energy efficiency</li> <li>- Aggregating energy efficiency gains from buildings to portfolio level.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Difficult to estimate proportion of funds invested in energy efficiency</li> <li>- Limited to cost effective investment within the investment timeframe of each fund</li> <li>- Should deliver adequate return investment performance returns to investors, aligned with the investment risk, and (if possible) measurable and comparable to financial instruments that provide a similar level of returns</li> <li>- In the absence of specific regulatory requirements, achievements will occur but could be limited to best practice within the industry, or to focus on the low-hanging fruit, e.g. just “quick wins”.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- None</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Real Estate and Infrastructure Funds already have scale, but they can benefit from increasing the visibility of energy efficiency investments in their portfolios</li> <li>- While there are good examples of sustainability reporting by these funds, an increased focus on this – integrated with traditional financial reporting – would help raise the profile of energy efficiency</li> </ul>

<sup>151</sup> GRESB. (2013). *2013 GRESB REPORT*. Retrieved from: [http://gresb.com/content/GRESB\\_Report\\_2013\\_Singlepage\\_HR.pdf](http://gresb.com/content/GRESB_Report_2013_Singlepage_HR.pdf)

### 5.3.1.6. Energy Performance Contracting (Private Sector Provider)

An Energy Performance Contract is a contractual arrangement between a host beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings.

EEFIG draws a distinction between “financing Energy Performance Contracts” in which the Energy Performance Contract provider also provides finance and “operational Energy Performance Contracts” where the finance is provided by the project host. Operational Energy Performance Contracts secure the energy savings, which reduces the risk for the lenders to the host. Some financing Energy Performance Contracts have been provided off-balance sheet accounting for the host (thus not increasing its debt ratios), but this depends on the details of the contract and (for the public sector) on national accounting rules.

Energy Performance Contracting (Private Sector Provider)	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- Numerous for buildings: London’s RE:FIT programme (UK)<sup>152</sup>; ELENA projects in Milan (IT)<sup>153 154</sup> and Barcelona (ES)<sup>155</sup>, Berlin Jewish Museum<sup>156</sup>, Alsace high schools (FR)<sup>157</sup>, Barts Health Care Trust<sup>158</sup>, Peterborough Council<sup>159</sup>, Croatian ESCO HEP<sup>160</sup></li> <li>- In industry: CDC Climat’s 5E Fund.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Turnkey contract: the Energy Performance Contract represents a one stop shop for the customer, with only one counterpart for the entire duration of the contract</li> <li>- Guaranteed savings: Energy Performance Contract provider manages the performance risks</li> <li>- Professionalism and expertise of Energy Performance Contract providers</li> <li>- Energy Performance Contract provider can bring financing or facilitate access to finance through savings guarantee.</li> </ul>

<sup>152</sup> Greater London Authority. (2014). *RE:FIT – Putting our energy into reducing yours*. Retrieved from: <http://www.london.gov.uk/priorities/environment/tackling-climate-change/energy-efficiency/refit-putting-our-energy-reducing-yours>  
See also October 2014 presentation below:

RE:FIT PROGRAMME. (2014). *Setting Up and Managing a City Energy Performance Programme*. [PDF document]. Retrieved from: [http://managenergy.net/lib/documents/1221/original\\_REFIT\\_-\\_Tristan\\_Oliver.pdf?1412843780](http://managenergy.net/lib/documents/1221/original_REFIT_-_Tristan_Oliver.pdf?1412843780)

<sup>153</sup> Zobot, S. (2014). *Innovative finance for energy efficiency and renewables: feedback from successful projects*. [PDF document]. Retrieved from [http://managenergy.net/lib/documents/1217/original\\_Milan\\_-\\_Sergio\\_Zobot.pdf?1412843661](http://managenergy.net/lib/documents/1217/original_Milan_-_Sergio_Zobot.pdf?1412843661)

<sup>154</sup> Climate Policy Initiative. (2014). *Early Lessons on Introducing Energy Performance Contracts in Italy: Milan’s Energy Efficiency Program*. Retrieved from: <http://climatepolicyinitiative.org/wp-content/uploads/2014/09/SGG-Brief-Early-Lessons-on-Introducing-Energy-Performance-Contracts-in-Italy-Milans-Energy-Efficiency-Program.pdf>

<sup>155</sup> Diputació Barcelona. (2014). *REDIBA (Renewables and energy efficiency in Barcelona Province)*. [PDF document]. Retrieved from: [http://managenergy.net/lib/documents/1219/original\\_REDIBA\\_-\\_A.\\_Vendrell\\_Roca.pdf?1412843726](http://managenergy.net/lib/documents/1219/original_REDIBA_-_A._Vendrell_Roca.pdf?1412843726)

<sup>156</sup> EEEF. (2012). *EEEF Finances the Berlin Jewish Museum’s Retrofit*. [Website]. Retrieved from: [http://www.eeef.eu/news-detail/items/EEEF\\_finances\\_the\\_Berlin\\_Jewish\\_Museums\\_retrofit.html](http://www.eeef.eu/news-detail/items/EEEF_finances_the_Berlin_Jewish_Museums_retrofit.html)

<sup>157</sup> EESI. (2010). *Good practice examples High schools in Alsace Region*. [PDF document]. Retrieved from: [http://www.european-energy-service-initiative.net/fileadmin/user\\_upload/gea/good\\_practice\\_examples/GP\\_France/WP3.4.1\\_best\\_practice\\_example\\_EESI\\_RAEE\\_Alsace.pdf](http://www.european-energy-service-initiative.net/fileadmin/user_upload/gea/good_practice_examples/GP_France/WP3.4.1_best_practice_example_EESI_RAEE_Alsace.pdf)

<sup>158</sup> Barts Healthcare Trust. (2014). [Website]. Retrieved from: <http://www.bartshealth.nhs.uk/>

<sup>159</sup> Peterborough City Council. *Housing*. Retrieved from: <http://www.peterborough.gov.uk/housing.aspx>

<sup>160</sup> HEP ESCO. (2014). [Website]. Retrieved from: <http://www.hep.hr/esco/en/aboutus/default.aspx>

<b>Energy Performance Contracting (Private Sector Provider)</b>	
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- In many cases, focused on short payback times due to low requirements of the client host, although the private sector is able to deliver deep renovation through Energy Performance Contract (when requested)</li> <li>- Increases transaction costs</li> <li>- Requires more developed skills on the client side</li> <li>- Lack of standardised framework and templates.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Accounting treatment needs to be clarified for public and private clients</li> <li>- Lack of confidence in ESCOs</li> <li>- Lack of understanding of the Energy Performance Contract concept, in particular in the housing sector</li> <li>- Lack of capacity and willingness of the client side to launch Energy Performance Contracts for deep renovation of buildings</li> <li>- Split incentives in the buildings rental sectors</li> <li>- Procurement regulations may not be adapted at national level</li> <li>- Energy Performance Contract is seen as a self-financing whereas for deep renovation it is only part of the financing – the rest can come from grants or additional investment from the owner based on “green value”</li> <li>- Deep renovation often happens with general refurbishment measures which increase the overall investment</li> <li>- Fear of externalisation of energy management</li> <li>- Lack of access to public support schemes for Energy Performance Contract providers (tax breaks, soft loans, reduced or no VAT...) compared to project host and in-house ESCOs.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Capacity building on Energy Performance Contract towards public authorities (in particular financial and procurement departments) and private clients</li> <li>- Market facilitation and aggregation programmes, notably through project development assistance</li> <li>- Possibility for construction SMEs to group themselves to be able to offer Energy Performance Contracts</li> <li>- Standardisation of contracts and procurement procedures</li> <li>- Proper implementation by Member States of article 19 of the Energy Efficiency Directive (2012/27/EU) on the removal of obstacles to Energy Performance Contract in public sector</li> <li>- Proper implementation by Member States of article 7 (b) of the Energy Efficiency Directive on the partnership with obligated parties in order to preserve the energy saving targets towards the customer</li> <li>- Addressing the supply of finance supporting the Energy Performance Contract sector through making dedicated credit lines, guarantees<sup>161</sup> and factoring funds more considerate of the Energy Performance Contract model, where appropriate.</li> </ul>

<sup>161</sup> Described in EU Directive 2012/27/EU on Energy Efficiency, recital 52.

### 5.3.1.7. Leasing

Leasing is how the host obtains the use of machinery, vehicles or, in this case, highly energy efficient equipment, or other EE measures, on a rental basis. This avoids the host’s need to invest its own capital in the equipment. Ownership rests in the hands of the lessor (financial institution or leasing company), while the business has the actual use of the equipment. Applied to energy efficiency, it can be used to overcome the issue of higher upfront costs for energy efficiency investments, as payments in a lease merge capital and operational expenditures.

<b>Leasing</b>	
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Integrates life cycle costs</li> <li>- Can obtain off-balance sheet accounting treatment (equipment can be included in income statement as a lease expense, not on balance sheet as a purchase)</li> <li>- Some tax advantages in some jurisdictions</li> <li>- Conserving working capital and avoiding down payments</li> <li>- Well understood instrument by equipment suppliers and hosts.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Restricted to removable assets (energy management systems, boilers, cogeneration, printers, IT, etc.), which reduces the level of energy savings that can be achieved</li> <li>- Host may pay a higher price over the long term (depending upon implicit finance costs etc.)</li> <li>- Leasing commits host to retaining a piece of equipment for a certain time period, which causes a degree of “lock-in”.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Problems with use for deep renovation or holistic corporate energy efficiency investment programmes</li> <li>- Lack of “Best practice examples” for Energy Efficiency</li> <li>- Accounting treatment is under review</li> </ul>

### 5.3.2. Emerging Financial Instruments

EEFIG participants hold high expectations of certain “innovative” or emerging financial instruments which have a shorter track record yet can unlock new and more tailored finance sources for energy efficiency investments:

#### 5.3.2.1. On-Bill Repayment

On-Bill repayment is a mechanism used to improve the creditworthiness (or seniority) of energy efficiency investments by having them repaid within the utility, or tax, bill and recovered through the existing payment collection infrastructures of utilities, or public authorities. This leverages the existing payment relationship between customer and utility, or tax authority, and directly provides a “credit history” giving an accurate view of likely defaults (as customer payment histories with both utilities and tax payments are long and exhibit low default rates compared to other consumer finance).

On-bill repayment has been used mostly for investments in buildings, but some schemes in the US target industry and SMEs (e.g. Massachusetts).

<b>On-Bill Repayment</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- Green Deal in the UK</li> <li>- Utility obligation programmes in the USA.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Energy savings connected to energy bills</li> <li>- Public sector actors and utilities are more trusted by decision makers</li> <li>- Reduces transaction costs</li> <li>- Can overcome the split incentive between user and owner as it is connected to property (or corporate asset) not user</li> <li>- Overcomes the “split incentive over time” (ie short detention/occupancy time for buildings) as repayment obligation can be passed attached to the asset on to the next owner/user</li> <li>- Overcomes the lack of finance capacity of homeowners and SMEs.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- May initially require additional public support (in form of risk sharing facility) to provide finance at an acceptable cost</li> <li>- Can be perceived as complex by users and may require technical assistance in order to avoid focus on low-hanging fruits</li> <li>- Complex instrument to manage/ market</li> <li>- Might crowd out small ESCOs.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- May require changes in the legal framework, in order to comply with banking monopoly regulations</li> <li>- May require modification to utility/ tax collection processing systems and/or tax code/ energy laws.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Green Deal espoused by a “public financial institution” (based upon the KfW approach) and offered at attractive rates and marketed by utilities to their customers</li> <li>- Review and showcase of working case studies from USA.</li> </ul>



### 5.3.2.2. On-Tax Finance (PACE)

The U.S. Property Assessed Clean Energy (PACE) is the key example for this instrument. PACE consists in a scheme in which money is lent to a building owner to retrofit a building, but the loan is attached to the property and reimbursed through local taxes by the occupant. The fact that payments are integrated in local taxes enhances their creditworthiness, since taxes have almost zero non-payment rates in the US and they are senior to any other debt.

If the building is sold, the “loan” can be reimbursed, or taken on by new owner. If the building is rented, it is the tenant who pays the tax and benefits from the savings, and the change of tenant has no impact on the repayments. Financing can be provided by the local authority or by private funds; in the latter case, the role of the public sector is to secure reimbursement by integrating it in tax collection (usually against a collection fee), while private companies are in charge of engaging building owners and signing contracts with them.

<b>On-Tax Finance</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- PACE has developed mostly in the commercial buildings sector, and a small amount of residential PACE in California and France.</li> <li>- In December 2013, there were 26 active PACE programmes in the US (200 commercial PACE projects had been completed, representing USD 56 million and an upcoming pipeline of USD 215 million)</li> <li>- In California, 6,000 homes have signed a PACE contract, as the State set-up a “PACE Loss Reserve programme” to overcome the FHFA’s negative 2010 ruling for homeowners.</li> <li>- In March 2014, the first residential PACE bond was issued for USD 104 million, securitising contracts from the privately-funded HERO PACE programme.</li> <li>- In Europe, the Picardie and Alsace regions (France) are planning to adapt the PACE scheme for detached housing. They will set up a Public Service for Energy Efficiency (PSEE) entity which will accompany homeowners through the whole process to reach a deep renovation of their home. PSEE will help homeowners set up the financing plan through equity, tax incentives and bank loans; the remaining finance will be provided by the PSEE and recouped through local taxes.</li> <li>- So far, no examples of PACE schemes in industry have been reported.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Can overcome the split incentive between user and owner as it is connected to property (or corporate asset) not user</li> <li>- Overcomes the “split incentive over time” (ie short detention/occupancy time for buildings) as repayment obligation can be passed attached to the asset on to the next owner/user</li> <li>- Reduces the default risk (taxes are the most senior debt)</li> <li>- Can be used to finance deep renovation if that is the intention of the scheme</li> <li>- Can be run with public or private finance.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Impact on public debt if financed through public money</li> <li>- Legal complications related to the lien priority can occur</li> <li>- Some mortgage lenders can refuse to finance PACE mortgages because in case of default PACE loans are paid off before the main mortgage is paid to the lender.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Requires the establishment of a specific legal framework</li> <li>- Requires modification to the tax collection systems</li> <li>- Would need to consider State-Aid clearance in EU.</li> </ul>

<b>On-Tax Finance</b>	
<b>What is needed to roll-out the instrument at larger scale</b>	- Pilot projects to adapt and roll-out the PACE model in different Member States.

### *5.3.2.3. Energy Efficiency Investment Funds*

Energy efficiency investment funds are specific investment vehicles created to invest only in energy efficiency projects targeting both buildings and industry usually seeking a return based on savings achieved. Such funds target Socially Responsible Investment (SRI) investors and public financial institutions for their own fund-raising. The legal and financial arrangements and instruments at project level can vary from pure equity to debt provision. Some energy efficiency investment funds have partnered with governments as investor, promoter or guarantor. These funds often target the generation of ongoing operational cost savings and carbon emission reductions as well as improvements to productivity and asset values, in compliance with current and prospective regulations.

<b>Energy Efficiency Funds</b>	
<b>Best Practice Examples:</b>	- Private funds: Sustainable Development Capital Limited, SUSI partners, 5E fund - Public funds: European Energy Efficiency Fund.
<b>Advantages</b>	- Dedicated vehicles for energy efficiency investing, which allows to better track the use of proceeds than in a general investment fund - Attractive to SRI investors.
<b>Weaknesses</b>	- High return and liquidity requirements may entail a focus on short and medium paybacks, not tapping higher energy savings potential.
<b>Main obstacles to the instrument</b>	- The lack of a clear project pipeline makes it difficult to show a clear business case to investors - Off-balance sheet accounting is a clear specification of public and industrial clients, but accounting frameworks make it increasingly difficult to ensure - Counterparty risk remains a key factor which may prevent a large number of investments in SMEs.
<b>What is needed to roll-out the instrument at larger scale</b>	- Support the development of a pipeline of projects - Guarantees or first loss facilities from public sources targeted to reduce the counterparty risk of SMEs.

### 5.3.2.4. Green Bonds

Green bonds are a financial instrument in which the proceeds are exclusively applied to (new and existing) “green projects” defined here as projects and activities that promote climate or other environmental sustainability outcomes<sup>162</sup>. Given the long-term, stable characteristics of energy efficiency investments, debt financing is usual and the new market for green bonds is a natural place for investors to seek capital for investments in green buildings and energy efficiency in industry. Green bonds can finance investments in energy efficiency of buildings and industry in two ways: either directly through bonds issued by corporations, or indirectly through bonds issued by banks, which in turn can on-lend to all types of energy efficiency project hosts.

<b>Green Bonds</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- The first bond labelled "green" was issued in 2007 by the EIB. Since then other issuers have joined the green bond market, and issued over \$35 billion of them during 2014<sup>163</sup>, including:</li> <li>- Swedish property group Vasakronan Green Bonds SEK1.3bn (\$197m) in Nov 2013, SEK1bn (\$157m) in March 2014</li> <li>- Unibail-Rodamco green property bond EUR750m 10 year, A+, Feb 2014</li> <li>- Skanska green property bond, 5yr, SEK850mm (\$131m), April 2014</li> <li>- Vornado Realty green property bond, \$450m, 5yr, BBB, June 2014</li> <li>- Förvaltaren green property bond \$55mm (SEK 400m), 5yr, AA-, Oct 2014</li> <li>- Development Bank of Japan green property bond, EUR 250m (\$315m), coupon 0.25%, 3yr, Aa3/A+, Oct 2014</li> <li>- KfW, EIB, NRW Bank, and other public financial institutions</li> <li>- Ile de France region<sup>164</sup></li> <li>- Cross Key Homes housing association (UK) <sup>165</sup></li> <li>- SCA in the industry sector<sup>166</sup>.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Large and deep pools of investor finance</li> <li>- Could be applied to most energy efficiency investments</li> <li>- High leverage effect</li> <li>- No need for public funding</li> <li>- Strong market signalling</li> <li>- Simplifies means to attract new investors</li> <li>- Diversification of investor base</li> <li>- Strong CSR message from issuer</li> <li>- Strong demand from investors (\$10bn in 2013, \$35bn in 2014).</li> </ul>

<sup>162</sup> More detail on the definition of Green Bonds please see below:

Climate Bonds Initiative. (2015). [Website]. Retrieved from: <http://www.climatebonds.net/>

<sup>163</sup> Goossens, E. (2014, June 3). Green Bonds Seen Tripling to \$40 Billion on New Entrants. *Bloomberg*. <http://www.bloomberg.com/news/articles/2014-06-03/green-bonds-seen-tripling-to-40-billion-on-new-entrants>

<sup>164</sup> Kidney, S. (2015, April 15). Île-de-France issues EUR600m( \$830m), 12yr, AA+ Green Muni. They had so many orders in one hour they upped it from 350m to 600m! *Climate Bonds Initiative*. Retrieved from: <http://www.climatebonds.net/2014/05/%C3%AEle-de-france-issues-eur600m-830m-12yr-aa-green-muni-they-had-so-many-orders-one-hour>

<sup>165</sup> Land, J. (2014, September 14). Housing association issues sector's 'first green bond'. *Dash*. Retrieved from: <http://www.24dash.com/news/housing/2014-09-09-Housing-associations-issues-sectors-first-green-bond>

<sup>166</sup> SCA. (2015). *SCA first Swedish listed company to issue green bond*. [Website]. Retrieved from: <http://www.sca.com/en/Media/Press-releases/Press-releases/2014/SCA-first-Swedish-listed-company-to-issue-green-bond/>

<b>Green Bonds</b>	
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Need to meet investors' expectations in terms of size of issue and liquidity</li> <li>- Issuers need to provide a minimum level of assurance to investors: green quality of the buildings financed, external verification of the use of proceeds, management of proceeds and environmental impact measurement</li> <li>- Most critical challenge for growing green bonds market is environmental integrity: current green bonds use a wide range of measurement for environmental performance and provide limited information on what the proceeds will be used for</li> <li>- Investors are not able to exit if use of proceeds is not in line with their expectations or if the investments are not implemented.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Ability of issuers to provide the relevant key performance indicators to both select eligible green building projects and provide quality assurance reporting</li> <li>- Minimum size of projects or projects portfolio (eg. \$50-100m)</li> <li>- Lack of a clear definition of and standards for green bonds in technical and governance terms</li> <li>- Lack of an acknowledged index for green bonds prevents some institutional investors from investing.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Some level of standardisation in the issuance process</li> <li>- Standardisation of the technical aspects in measuring the environmental performance delivered by use of proceeds</li> <li>- Stricter reporting and governance and third party verification of use of proceeds.</li> <li>- Further development of Green bond indices.</li> </ul>

### **5.3.2.5. Energy Services Agreement**

The Energy Service Agreement (ESA) is a "pay-for-performance" service contract between a third-party investor and an asset owner to deliver energy savings as a service. The ESA is in some ways an evolution of the traditional shared-savings model, provided through Energy Performance Contracts (Energy Performance Contracts), but it is structured more like a Power Purchase Agreement (PPA) and used more frequently by actors present in the mainstream energy markets. A third party investor and an asset owner enter into an ESA contract (typically for 10 years) where the asset owner agrees to pay their historical utility bills to the third party. An upfront "access fee" or an ongoing utility bill discount may also be paid to the asset owner as incentive. The third party invests into money-saving, energy efficient opportunities and owns and operates the energy equipment to provide "energy services" to the asset/ building. In industry, ESAs need to take into account the risk of decreased activity and thus could have to adapt the contract duration, as well as guarantee a residual value for the assets.

<b>Energy Services Agreement</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- US providers such as Transcend Equity, Metrus Energy, Green City Finance, Abundant Power.</li> <li>- UK example of Sustainable Development Capital LLP.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Bilateral contract does not require new regulations</li> <li>- Overcomes some traditional EE barriers (eg. split incentives)</li> <li>- No capex for owner, aligns incentives of project developer, building owner and investor.</li> </ul>

<b>Energy Services Agreement</b>	
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Limited scale to date</li> <li>- Fragmented market</li> <li>- 10 year contract period can limit third party measures installed to low hanging fruits (high returns)</li> <li>- Limited willingness to commit to one energy supplier and the current price level (lock-in) as well as with contractual obligations on the side of the supplier</li> <li>- Increases transaction costs</li> <li>- Requires more developed skills on the client side</li> <li>- Lack of standardised framework and templates.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Accounting treatment should to be clarified</li> <li>- Lack of confidence in Energy Utilities as conflicted “energy managers”</li> <li>- Lack of understanding of the ESA concept</li> <li>- Unlikelihood of the use of ESAs for deep renovation of buildings</li> <li>- Fear of externalisation of energy management.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Education of building owners and project developers</li> <li>- Need for more pilots to help develop the market</li> <li>- Clarity on lease accounting and investors’ rights in case of bankruptcy, tenant change or sale of host building.</li> </ul>

#### **5.3.2.6. Public ESCOs for Deep Renovation (Housing and Public Buildings)**

A public Energy Service Company (“ESCO”) is a special purpose publicly-owned company designed to manage energy efficiency investments and to deliver guaranteed savings to a host and counterparty to an Energy Performance Contract which is set up with public funds in order to accelerate the implementation of Energy Performance Contracts in sectors and regions where the private sector offer is not sufficient. Public ESCOs can also reduce the cost of financing by aggregating specific credit lines, public grants and other incentives especially if the public body establishing it provides a guarantee or capital to deliver a strong credit rating. EEFIG sees public ESCOs as mainly tackling public buildings, taking advantage of adapted public procurement rules, and certain types of housing in some regions.

<b>Public ESCOs for Deep Renovation (Public Buildings and Housing)</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- Rhône-Alpes region (FR) is developing an in-house ESCO called OSER<sup>167</sup> together with municipalities, which will set up and finance Energy Performance Contracts for deep retrofits of public buildings and sub-contract to the private sector all the operational parts of Energy Performance Contract (design, build and maintain).</li> <li>- Ile-de-France region is setting up Energies Posit’If<sup>168</sup>, as a financial engineering expert subcontracting technical tasks, to implement Energy Performance Contracts for owner-occupied multifamily buildings<sup>169</sup>, aiming at low-energy renovation, with contracts expected to last 15 to 20 years.</li> </ul>

<sup>167</sup> OSER. (2014). Innovative financing for energy and renewables: feedback from successful projects. [PDF documents]. Retrieved from: [http://managenergy.net/lib/documents/1218/original\\_Pr%C3%A9sentation\\_Bruxelles\\_081014\\_VA\\_OSER.pdf?1412843690](http://managenergy.net/lib/documents/1218/original_Pr%C3%A9sentation_Bruxelles_081014_VA_OSER.pdf?1412843690)

<sup>168</sup> Energies POSIT’IF. (2013). A public ESCO for the low energy refurbishment of condominiums in Ile-de-France region, [PDF document]. Retrieved from: [http://www.eusew.eu/upload/events/516\\_7517\\_positif%20brussels%2027%20june.pdf](http://www.eusew.eu/upload/events/516_7517_positif%20brussels%2027%20june.pdf)

<sup>169</sup> Groupe ICF. (2011). *Schiltigheim, France Energy performance contract for 64 social dwellings*. Retrieved from: <http://www.buildup.eu/sites/default/files/content/Schiltigheim%20EPC%20-%20Detailed%20presentation.pdf>

<b>Public ESCOs for Deep Renovation (Public Buildings and Housing)</b>	
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Overcomes lack of capacity of public authorities and homeowner associations</li> <li>- Creates a trusted entity which makes investing easier</li> <li>- Debt could be securitised once it reaches the right scale</li> <li>- Potential way to overcome the lack of willingness of private ESCOs to finance long-term investments through Energy Performance Contract</li> <li>- A transitional instrument to demonstrate the feasibility and create a market for private ESCOs in the future</li> <li>- Public sector actors are trusted by homeowners and public authorities</li> <li>- Targets deep renovation.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Impacts on public debt</li> <li>- May crowd out private sector ESCOs</li> <li>- Energy Performance Contract seems technically feasible on multifamily buildings, but the main obstacles remain the split incentives (in rental housing) and the long payback times.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Very “early stage” and limited to one Member State</li> <li>- Public budgets and abilities and in-house capabilities of local authorities to set-up new “finance related” instruments</li> <li>- Issues around quality control of projects and “value for money”</li> <li>- Need to be analysed and adapted country by country</li> <li>- May require changes in the legal framework, in order to comply with financial regulations and to access the same fiscal benefits as individual homeowners</li> <li>- The lack of a clear project pipeline</li> <li>- Accounting and regulatory treatment for new vehicles and their clients.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Proof of concept in more than one Member State and that the idea is quickly replicable within a Member State for both target segments (Housing and Public Buildings)</li> <li>- Clear accounting and financial regulatory treatment for both local authorities and the ESCOs clients</li> <li>- Project Development Assistance facilities to develop a pipeline of projects.</li> </ul>

### **5.3.2.7. Factoring Fund for Energy Performance Contracts**

Factoring is a financial transaction in which an entity sells its accounts receivable (usually invoices) to a third party (called a factor) at a discount. In energy efficiency terms a factoring fund for Energy Performance Contracts would purchase funded Energy Performance Contracts from their originators (usually ESCOs) at a discount, freeing up the balance sheet of the originators to originate more Energy Performance Contracts. As the risk of underperformance of an Energy Performance Contract is more likely to occur at the beginning of the contract, these “de-risked” contracts become a safer income stream which can be assigned (transferred) to a factoring fund.

An objective of this kind of fund would be to allow small Energy Performance Contract providers (once up the learning curve) to continue generating Energy Performance Contracts without breaching their own balance sheet covenants and limits with their banks. ‘Forfeiting’ arrangements are common practices in the most developed Energy Performance Contract markets (e.g. Germany) and leasing (in the form of sale-and-lease back) can also be an option if the contracts are adapted. Once active, such a fund could help establish standard legal and financial arrangements in the Energy Performance Contracts and then aggregate receivables into securities which can be sold in the form of bonds to institutional investors, once a critical size is reached (estimated at €150 million). A factoring fund may need public equity to speed its launch into the market, however, it



could also involve private equity and debt, if the public sector takes the first-loss risk or requires a lower return on equity.

<b>Factoring Fund for Energy Performance Contracts</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- In Bulgaria, the Energetics and Energy Savings Fund (EESF) buys the future receivables of Energy Performance Contracts (the energy savings) from ESCOs (established by the EBRD with a €7m initial loan followed by a €10m loan in 2012)</li> <li>- European Energy Efficiency Fund has used public and private money for forfeiting Energy Performance Contracts for the Berlin Jewish Museum.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Secures refinancing for Energy Performance Contract providers, clearing their balance sheets and contributing to lower their capital costs</li> <li>- Could contribute to standardise energy efficiency assets</li> <li>- Dedicated vehicles to support the Energy Performance Contract procurement model, which should allow easier tracking of their performance than when spread across many small ESCOs</li> <li>- Potentially attractive to SRI investors.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- New concept that will take time to mature</li> <li>- Unclear what “discounts” will make this work for Energy Performance Contract originators</li> <li>- Requires public money to kick-start.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Very “early stage” with limited pilot examples</li> <li>- Public budgets and abilities and in-house capabilities of public sector to set-up new fund</li> <li>- Issues around the discount rate and “value for public money”</li> <li>- Need to be analysed and adapted country by country</li> <li>- May require changes in contracts and the legal framework, comply with financial regulations and to access the same fiscal benefits as individual project hosts</li> <li>- The lack of a clear project pipeline</li> <li>- Accounting and regulatory treatment for new vehicles and their clients.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Support the development of a pipeline of “factoring ready” Energy Performance Contracts</li> <li>- Public investment (or a public financial institution) willing to provide first-loss or initial junior investment to new fund.</li> </ul>

### 5.3.2.8. Citizens Financing

Citizen financing can be broadly split in 2 categories: Community energy finance (usually a local community using a co-operative structure); and crowdfunding (using the internet to aggregate small investors, often to fund international development projects). Both instruments are retail focused (“bottom-up”) instruments currently used to fund renewables and could be used to fund energy efficiency investments.

In community energy projects, the investors live in the area where the investment takes place; they don't only have a financial return, but also benefit in-kind, e.g. they have access to renewable energy for free or at a lower tariff. Crowdfunding consists in the aggregation of investors who have no direct link to the project being funded and they must trust the website offering the scheme and the projects' promoters. For energy efficiency, EFIG can envisage community energy schemes being set-up to complete deep renovations of multifamily dwellings and/ or local community

facilities (schools, hospitals etc.) and the internet-based approach of crowdfunding might eventually reduce the cost of groups of “charismatic” energy efficiency project (eg. Drive to deliver competitiveness to local SMEs or for cutting edge EE technology demonstrator pilots).

<b>Citizens Funding</b>	
<b>Best Practice Examples:</b>	<ul style="list-style-type: none"> <li>- In Germany, there are over 500 energy co-operatives with 80,000 members which have invested up to EUR 800 million in solar plants</li> <li>- There are also a few examples of German community funding for schools energy retrofit through energy performance contracting eg. EcoWatt in Freiburg (DE)<sup>170</sup></li> <li>- Bettervest (Germany) has launched several building retrofit crowdfunding projects, although focussing on lighting and heating plants</li> <li>- Energie Partagée in France gathers equity from individuals in order to invest in community-owned projects (sometimes energy efficiency).</li> <li>- An example of a crowdfunding website Abundance, set up in 2012.</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Potentially low-cost source of financing</li> <li>- Involvement of citizens in the projects solving the aggregation and distribution issues</li> <li>- Positive publicity and social network-effects.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Legal framework still unclear</li> <li>- High trust required in website or intermediary structure (open to “fraud scandal”)</li> <li>- Unclear if community entity benefits from same fiscal benefits for EE investing (same issue for ESCOs)</li> <li>- Competence in project selection and design required to enhance network trust in crowdfunding.</li> </ul>
<b>Main obstacles to the instrument</b>	<ul style="list-style-type: none"> <li>- Very “early stage” with limited pilot examples</li> <li>- Funding and skills for generating positive publicity required by the project owners (if no central entity bundles projects)</li> <li>- Need to be analysed and adapted country by country</li> <li>- May require changes in contracts and the legal framework, comply with financial regulations and to access the same fiscal benefits as individual project hosts</li> <li>- The lack of a clear project pipeline</li> <li>- Accounting and regulatory treatment for new vehicles and their clients.</li> </ul>
<b>What is needed to roll-out the instrument at larger scale</b>	<ul style="list-style-type: none"> <li>- Third party evaluation of projects to increase public trust</li> <li>- Proof of concept in more than one Member State and that the idea is quickly replicable within a Member State for target segments</li> <li>- Clear accounting and financial regulatory treatment</li> <li>- Project Development Assistance facilities to develop some pilot trials.</li> </ul>

<sup>170</sup> Seifried, S. (2001). *The “ECO-Watt Project”: building a Negawatt power plant in a school*. Retrieved from: [http://www.ecee.org/library/conference\\_proceedings/ecee\\_Summer\\_Studies/2001/Panel\\_5/p5\\_12](http://www.ecee.org/library/conference_proceedings/ecee_Summer_Studies/2001/Panel_5/p5_12)

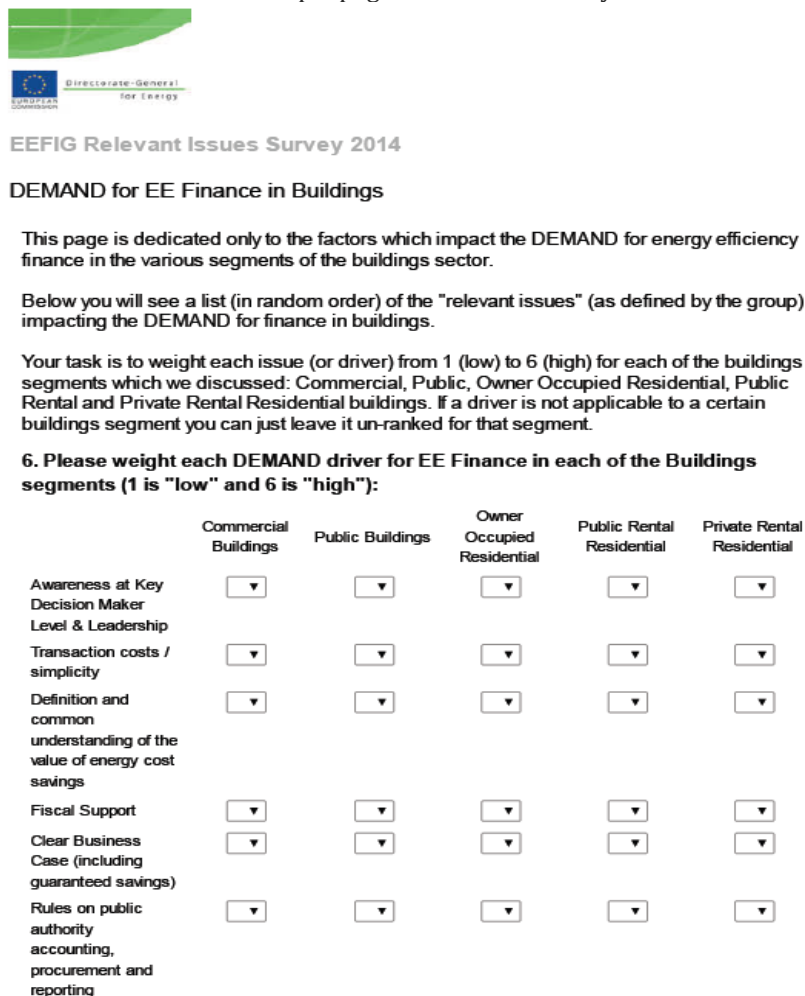
## 5.4. Methodology for the EEFIG Surveys

EEFIG undertook three online surveys to determine its participants detailed views of the relative importance of the drivers for demand for and supply of finance for energy efficiency investments in the different sub-sectors for buildings and industry and a specific survey for group views on the applicability of different mature and emerging financial instruments for these sub-sectors. In addition, free-text fields provided ample opportunity for participants to submit extensive written comments as input primarily to the tables and analysis contained in this report.

Each online survey as primed with the combined input from a meeting of EEFIG participants, an extensive debate and a "pin-board" results matrix. The results of these sessions were used to design and pre-test the online surveys. The results have enabled EEFIG to be more precise in its final report's analysis and enabled the group to be more precise and focused on critical issues and define consensus in the process. The two driver surveys also allowed EEFIG members to highlight approaches and instruments as content to subsequent meetings.

Typical online EEFIG surveys were short (3 to 4 pages in length) and were sent to the widest possible audience of EEFIG participants (a maximum of 155 email addresses in the last instance) and open for a pre-agreed timeframe. Survey participants were identified by name and EEFIG members who represented networks were encouraged to ask their expert network members to engage where possible. The following is an example page taken from the first EEFIG online survey:

Insert: Example page from EEFIG Survey 2014



**EEFIG Relevant Issues Survey 2014**

**DEMAND for EE Finance in Buildings**

This page is dedicated only to the factors which impact the DEMAND for energy efficiency finance in the various segments of the buildings sector.

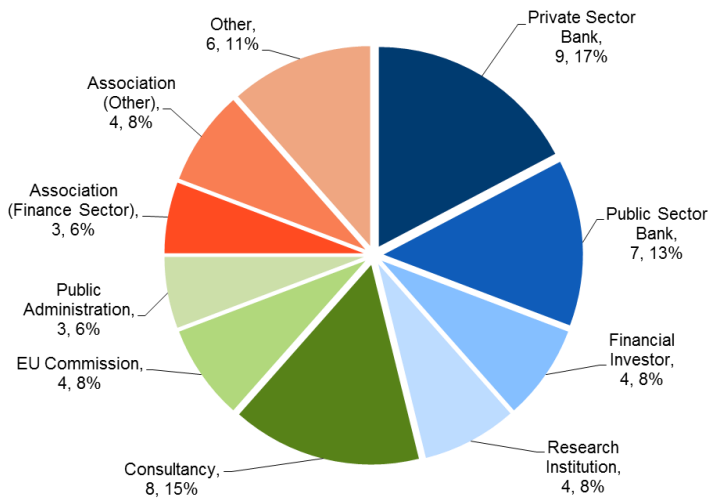
Below you will see a list (in random order) of the "relevant issues" (as defined by the group) impacting the DEMAND for finance in buildings.

Your task is to weight each issue (or driver) from 1 (low) to 6 (high) for each of the buildings segments which we discussed: Commercial, Public, Owner Occupied Residential, Public Rental and Private Rental Residential buildings. If a driver is not applicable to a certain buildings segment you can just leave it un-ranked for that segment.

**6. Please weight each DEMAND driver for EE Finance in each of the Buildings segments (1 is "low" and 6 is "high"):**

	Commercial Buildings	Public Buildings	Owner Occupied Residential	Public Rental Residential	Private Rental Residential
Awareness at Key Decision Maker Level & Leadership	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Transaction costs / simplicity	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Definition and common understanding of the value of energy cost savings	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Fiscal Support	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Clear Business Case (including guaranteed savings)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rules on public authority accounting, procurement and reporting	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

*Chart: EEFIG Relevant Driver Survey (2014) Response Breakdown*



In each of the EEFIG online surveys, statistical methods were used to weight, rank and prioritise drivers and financial instruments according to the group's input so that the group itself could better appreciate what the consensus opinion was and then dedicate time to the critical areas or debate the reasons for why the results were the way they were. The numbers of participants in the EEFIG online surveys were 56, 95 and 51 respectively for Buildings, Industry and Financial Instruments from a whole "active" population of 120 EEFIG participants.

The above chart shows the institutional categorization typical of an EEFIG online survey (taken from survey 1) and illustrates the broad sectoral participation in these surveys and the fact that around 40% of the respondents work for or represent financial institutions. In addition, the survey allowed for analysis of the responses by segment and therefore the differences between the collective "opinions" of groups of EEFIG participants were able to be assessed by responder type enabling a better understanding of the results. In each case, the survey responses were presented back to the group by the rapporteur and the whole group were able to comment and discuss the results to provide input into the report text.

## 6. Bibliography

- Ademe. (2013). *Étude comparative sur l'efficacité des soutiens publics aux investissements de maîtrise de l'énergie dans l'Union européenne*.
- Australian Government – Department of Industry. (2014). *Industry makes great gains from energy efficiency and has more potential*.
- Australian Government - Environment and Sustainable Development Directorate. (2014). *Energy Efficiency Improvement Scheme (EEIS)* [Website]. Retrieved from: [http://www.environment.act.gov.au/energy/energy\\_efficiency\\_improvement\\_scheme\\_eeis](http://www.environment.act.gov.au/energy/energy_efficiency_improvement_scheme_eeis)
- Australian Government Department of Industry, ClimateWorks Australia & IIGC. (2014). “*Energy Management and Company Competitiveness*”. Retrieved from: [http://www.igcc.org.au/Resources/Documents/climateworks\\_emcc\\_20141013.pdf](http://www.igcc.org.au/Resources/Documents/climateworks_emcc_20141013.pdf)
- Backlund, S., Ottonson, M., Palm, J., & Thollander, P. (2012). Extending the energy efficiency gap. *Journal of Energy Policy*, 51, 392.
- Barts Healthcare Trust. (2014). [Website]. Retrieved from: <http://www.bartshealth.nhs.uk/>
- Bauernhansl, T., Kasprowicz, R. & Stender, R. (2014). High Income Return and Safe Investments through Financing of Energy Efficient Measures in the Industry. *International Symposium on Green Manufacturing and Applications (ISGMA 2014)*, pp. 152-159. Retrieved from: [http://2014.isgma.org/data/ISGMA2014\\_proceedings\\_Web\\_v\\_F.pdf](http://2014.isgma.org/data/ISGMA2014_proceedings_Web_v_F.pdf)
- BNP Paribas Investment Partners. (2014). *Financing the energy renovation of buildings through Sustainable Funds – the only financial vehicle able to mobilise the large amounts of money needed in Europe*.
- BoAML. (2012). *SRI & Sustainability: Less is more, Global energy efficiency*. Retrieved from: <http://about.bankofamerica.com/assets/pdf/SRI-and-Sustainability-030112.pdf>
- BPIE. (2011). *Europe's Buildings under the Microscope: A country-by-country review of the energy performance of buildings*. Retrieved from: <http://www.institutebe.com/InstituteBE/media/Library/Resources/Existing%20Building%20Retrofits/Europes-Buildings-Under-the-Microscope-BPIE.pdf>
- BPIE. (2014). *Contribution to EEEFIG draft report - Topics: Energy Commissioner - Long term renovation strategies*.
- BPIFrance. (2015). *Le Prêt Éco-Énergie, pour améliorer votre efficacité énergétique*. [Website]. Retrieved from: <http://www.pee.bpifrance.fr>
- British Property Federation. (2009). *Fiscal incentives for greening*.
- Brounen, D. & Kok, N. (2009). *On the economics of energy labels in the housing market*. Retrieved from: <http://urbanpolicy.berkeley.edu/greenbuilding/brounenkok.pdf>
- Bullier, A., Sanchez, T., Le Teno, J. F., Carassus, J., Ernest, D., & Pancrazio, L. (2011). *Assessing green value: A key to investment in sustainable buildings*. Retrieved from: <http://www.buildup.eu/sites/default/files/content/Assessing%20Green%20Value%20-%20Bullier,%20Sanchez,%20Le%20Teno,%20Carassus,%20Ernest%20and%20Pacrazio%20-%20ECEEE%202011.pdf>
- Bullier, A., & Milin, C. (2013). *Alternative financing schemes for energy efficiency in buildings*. Retrieved from: [http://www.managenergy.net/lib/documents/868/original\\_3-221-13\\_Bullier\\_-\\_Alternative\\_financing.pdf](http://www.managenergy.net/lib/documents/868/original_3-221-13_Bullier_-_Alternative_financing.pdf)
- CA EED. (2014). *Transposition of energy audit obligation for large enterprises: Executive Summary Report 5.3*.

CA EED, CA EPBD & CA RES. (2013). *Assistance Documents for EU Member States in developing long term strategies for mobilising investment in building energy renovation (per EU Energy Efficiency Directive Article 4)*.

California Public Utilities Commission. (2012). *Energy Data Center: Briefing Paper*. Retrieved from: <http://www.cpuc.ca.gov/NR/rdonlyres/8B005D2C-9698-4F16-BB2B-D07E707DA676/0/EnergyDataCenterFinal.pdf>

Carbon Trust Advisory Services. (2010). *The Business of Energy Efficiency*. Retrieved from: <http://www.carbontrust.com/media/135418/cta001-business-of-energy-efficiency.pdf>

Cecimo. (2014). *The EU has to tackle the lack of investments to secure its industrial future*.

Ceres. (2013). *Power Factor: Institutional Investors' Policy Priorities Can Bring Energy Efficiency to Scale*. Retrieved from: <http://www.ceres.org/resources/reports/power-factor-institutional-investors2019-policy-priorities-can-bring-energy-efficiency-to-scale/view>

Ceres. (2014). *Investing in the Clean Trillion: Closing the Clean Energy Investment Gap*. Retrieved from: <http://www.ceres.org/resources/reports/investing-in-the-clean-trillion-closing-the-clean-energy-investment-gap/view>

CISL & UNEP FI. (2014). *Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III?* Retrieved from <http://www.unepfi.org/fileadmin/documents/StabilitySustainability.pdf>

Clean Energy Group and the Council of Development Finance Agencies. (2013). *Reduce Risk, Increase Clean Energy: How States and Cities are Using Old Finance Tools to Scale Up a New Industry*. Retrieved from: <http://kresge.org/sites/default/files/Clean-Energy-Group-Reduce-Risk-Increase-Clean-Energy.pdf>

Climate Bonds Initiative. (2013). *FYI: Full text of Green Bonds Framework-steering c'ttee now set up w. BoAML, Citi, JPM, MS + others in process of joining [Web log comment]*. Retrieved from: <http://www.climatebonds.net/2014/05/fyi-full-text-green-bonds-framework-steering-cttee-now-set-w-boaml-citi-jpm-ms-others>

ClimateWorks Australia & Climate Works Foundation. (2015). *Market Value Potential of Energy Efficiency: Presentation to IIGCC members* [PDF document].

Coalition for Energy Savings. (2013). *Indicative national energy efficiency targets fall short* [Website]. Retrieved from: <http://energycoalition.eu/indicative-national-energy-efficiency-targets-fall-short>

COM (2014) 21 /2.

COM (2014) 21 /2.

COM (2008) 780 final.

COM (2011) 0109 final.

COM (2011) 681 final.

COM(2014) 903 final.

COM (2012) Consultation Paper: "Financial Support for Energy Efficiency in Buildings".

COM (2014) 015 final.

COM (2014) C 200/01.

COM (2014) C 19/04.



- Climate Bonds Initiative. (2015). [Website]. Retrieved from: <http://www.climatebonds.net/>
- Climate Policy Initiative. (2014). *Early Lessons on Introducing Energy Performance Contracts in Italy: Milan's Energy Efficiency Program*. Retrieved from: <http://climatepolicyinitiative.org/wp-content/uploads/2014/09/SGG-Brief-Early-Lessons-on-Introducing-Energy-Performance-Contracts-in-Italy-Milans-Energy-Efficiency-Program.pdf>
- The Crowd. (2015). *Energy Investment Curve*. [Website]. Retrieved from: <http://thecurve.thecrowd.me/>
- Danish Energy Agency; Danish Ministry of Climate, Energy and Building; & Ministry of Foreign Affairs of Denmark. (2014). *Energy Savings Insurance: A Design*. Retrieved from: [http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/design\\_of\\_an\\_energy\\_savings\\_insurance\\_instrument\\_-\\_final\\_2.pdf](http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/design_of_an_energy_savings_insurance_instrument_-_final_2.pdf)
- Deutsche Asset and Wealth Management Real Estate. (2012). *Building Labels vs. Environmental Performance Metrics: Measuring What's Important about Building Sustainability*. Retrieved from: [http://www.rreef.com/content/\\_media/Research\\_Sustainability\\_Metrics\\_in\\_the\\_Real\\_Estate\\_Sector-Oct\\_2012.pdf](http://www.rreef.com/content/_media/Research_Sustainability_Metrics_in_the_Real_Estate_Sector-Oct_2012.pdf)
- Deutsche Bank & Living Cities. (2012). *Recognizing the Benefits of Energy Efficiency in Multifamily Underwriting*. Retrieved from: [https://www.db.com/cr/en/docs/DB\\_Living\\_Cities\\_Report\\_-\\_Recognizing\\_the\\_Benefits\\_of\\_Energy\\_Efficiency\\_in\\_Multifamily.pdf](https://www.db.com/cr/en/docs/DB_Living_Cities_Report_-_Recognizing_the_Benefits_of_Energy_Efficiency_in_Multifamily.pdf)
- DIHK. (2014). "Investment barriers and structural challenges for the German industry" [PDF document].
- Diputació Barcelona. (2014). *REDIBA (Renewables and energy efficiency in Barcelona Province)*. [PDF document]. Retrieved from: [http://managenergy.net/lib/documents/1219/original\\_REDIBA\\_-\\_A.\\_Vendrell\\_Roca.pdf?1412843726](http://managenergy.net/lib/documents/1219/original_REDIBA_-_A._Vendrell_Roca.pdf?1412843726)
- Directive 2010/31/EU.
- DIW. (2013). *Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward*. Retrieved from: [http://diw.de/documents/publikationen/73/diw\\_01.c.422405.de/hudson\\_financing.pdf](http://diw.de/documents/publikationen/73/diw_01.c.422405.de/hudson_financing.pdf)
- E. ON Research Centre. *Presentation slides set out a case of a hospital energy performance contract being developed*
- E3G. (2010). *Briefing. Financing energy efficiency: Bringing together the Green Infrastructure Bank, green bonds and policy*. Retrieved from: [http://www.e3g.org/docs/E3G\\_Financing\\_energy\\_efficiency\\_Bringing\\_together\\_the\\_Green\\_Infrastructure\\_Bank\\_Green\\_Bonds\\_and\\_Policy.pdf](http://www.e3g.org/docs/E3G_Financing_energy_efficiency_Bringing_together_the_Green_Infrastructure_Bank_Green_Bonds_and_Policy.pdf)
- E3G. (2011). *Financing the Green Deal – Carrots, sticks and the Green Investment Bank*. Retrieved from: [http://www.e3g.org/docs/E3G\\_Financing\\_the\\_Green\\_Deal\\_May\\_2011.pdf](http://www.e3g.org/docs/E3G_Financing_the_Green_Deal_May_2011.pdf)
- E3G. (2012). *The Macroeconomic Benefits of Energy Efficiency – The case for public action*. Retrieved from: [http://www.e3g.org/images/uploads/E3G\\_The\\_macro-economic\\_case\\_for\\_energy\\_efficiency-Apr\\_2012.pdf](http://www.e3g.org/images/uploads/E3G_The_macro-economic_case_for_energy_efficiency-Apr_2012.pdf)
- E3G. (2013). *Briefing paper. Public support, competitiveness and growth: Why energy efficiency is a key component for making the 2030 package work*. Retrieved from: [http://www.e3g.org/docs/E3G\\_Public\\_support,\\_competitiveness\\_and\\_growth\\_-\\_Why\\_energy\\_efficiency\\_is\\_a\\_key\\_component\\_for\\_making\\_the\\_2030\\_package\\_work.pdf](http://www.e3g.org/docs/E3G_Public_support,_competitiveness_and_growth_-_Why_energy_efficiency_is_a_key_component_for_making_the_2030_package_work.pdf)
- E3G. (2014). *The Green Deal, the Green Investment Bank and the Green Deal Finance Company: A snapshot*.

- EASAC. (2013). *Trends in extreme weather events in Europe: implications for national and European Union adaptation strategies*. Retrieved from: [http://www.easac.eu/fileadmin/PDF\\_s/reports\\_statements/Easac\\_Report\\_Extreme\\_Weather\\_Events.pdf](http://www.easac.eu/fileadmin/PDF_s/reports_statements/Easac_Report_Extreme_Weather_Events.pdf)
- EASME. (2014). *Overview of financing solutions for energy efficiency in buildings*
- Ebrahim, Z., Inderwildi, O. R., & King, D. A. (2014). Macroeconomic impacts of oil price volatility: mitigation and resilience. DOI 10.1007/s11708-014-0300-3. Retrieved from: <http://www.smithschool.ox.ac.uk/news/FEP-14003-EZ-proof-checked.pdf>
- EBRD. (2015). *Improving Industrial Energy Efficiency: Thematic factsheet*. Retrieved from: <http://www.ebrd.com/downloads/research/factsheets/industriale.pdf>
- EBRD Sustainable Energy Initiative. (2014). *Developing Corporate Energy Efficiency: Managing Resources to Boost Productivity*. Retrieved from: <http://www.ebrd.com/downloads/sector/eccc/managing-resources.pdf>
- ECEEE. (2013). *European competitiveness and energy efficiency: Focusing on the real issue*. Retrieved from: <http://www.eceee.org/all-news/press/2013/the-real-issue-on-energy-and-competitiveness/ee-and-competitiveness>
- ECEEE. (2014). *Industrial Audits: A comprehensive and evidence-based primer for policy-makers and decision makers in the private and public sectors*.
- ECEEE. (2013). *Understanding the Energy Efficiency Directive – Steering through the maze #6: A guide from eceee*. Retrieved from: <http://www.eceee.org/policy-areas/EE-directive/maze-6>
- Ecofys. (2012). *Climate protection with rapid payback Energy and emissions savings potential of industrial insulation in EU27*. Retrieved from: [http://www.eiif.org/awm/downloads/EU-Study\\_ClimateProtectionWithRapidPayback.pdf](http://www.eiif.org/awm/downloads/EU-Study_ClimateProtectionWithRapidPayback.pdf)
- Ecofys. (2014). *Subsidies and costs of EU energy: An interim report*.
- Ecorys. (2009). *FWC Sector Competitiveness Studies - Competitiveness of the EU Metalworking and Metal Articles Industries*.
- The Economist Intelligence Unit. (2012). *Energy efficiency and energy savings – A view from the building sector*. Retrieved from: [http://www.economistinsights.com/sites/default/files/downloads/EIU\\_GBPN\\_EnergyEfficiency\\_120921r3.pdf](http://www.economistinsights.com/sites/default/files/downloads/EIU_GBPN_EnergyEfficiency_120921r3.pdf)
- The Economist Intelligence Unit. (2013). *Intelligent manufacturing: Targeting better energy efficiency*. Retrieved from: [http://www.economistinsights.com/sites/default/files/EIU-ABB\\_Energy%20Efficiency%202013.pdf](http://www.economistinsights.com/sites/default/files/EIU-ABB_Energy%20Efficiency%202013.pdf)
- The Economist Intelligence Unit. (2013). *Investing in energy efficiency in Europe's buildings – A view from the construction and real estate sectors*. Retrieved from: [http://www.gbpn.org/sites/default/files/06.EIU\\_EUROPE\\_CaseStudy.pdf](http://www.gbpn.org/sites/default/files/06.EIU_EUROPE_CaseStudy.pdf)
- Ecofys, Ecorys & Bio Intelligence Service. (2010). *Study to Support the Impact Assessment for the EU Energy Saving Action Plan*.
- EEEF. (2012). *EEEF Finances the Berlin Jewish Museum's Retrofit*. [Website]. Retrieved from: [http://www.eeef.eu/news-detail/items/EEEF\\_finances\\_the\\_Berlin\\_Jewish\\_Museums\\_retrofit.html](http://www.eeef.eu/news-detail/items/EEEF_finances_the_Berlin_Jewish_Museums_retrofit.html)
- EESI. (2010). Good practice examples High schools in Alsace Region. [PDF document]. Retrieved from:

[http://www.european-energy-service-initiative.net/fileadmin/user\\_upload/gea/good\\_practice\\_examples/GP\\_France/WP3.4.1\\_best\\_practice\\_example\\_EESI\\_RAEE\\_Alsace.pdf](http://www.european-energy-service-initiative.net/fileadmin/user_upload/gea/good_practice_examples/GP_France/WP3.4.1_best_practice_example_EESI_RAEE_Alsace.pdf)

- EEW. (2013). *Good practice ways out of energy dept – Implementation of energy efficiency policies in EU Member States*. Retrieved from: [http://www.energy-efficiency-watch.org/fileadmin/eew\\_documents/Documents/EEW2/Good\\_practice\\_ways\\_out\\_of\\_energy\\_debt\\_BROCHURE.pdf](http://www.energy-efficiency-watch.org/fileadmin/eew_documents/Documents/EEW2/Good_practice_ways_out_of_energy_debt_BROCHURE.pdf)
- EEW. (2013). *Improving and Implementing National Energy Efficiency Strategies in the EU Framework – Findings from Energy Efficiency Watch II Analyses*. Retrieved from: [http://energy-efficiency-watch.org/fileadmin/eew\\_documents/images/Event\\_pictures/EEW2\\_Logos/EEW-Final\\_Report.pdf](http://energy-efficiency-watch.org/fileadmin/eew_documents/images/Event_pictures/EEW2_Logos/EEW-Final_Report.pdf)
- EIB. (2012). *Energy Efficiency Investments by Public Banks: EIB Estimation from several external studies* [Presentation 11.01.2013.].
- EIB. (2015). *Investment Plan for Europe*. [Website]. Retrieved from: <http://www.eib.org/about/invest-eu/index.htm>
- EIB & European Commission. (2014). *Announcement of the new EIB Product under the Programme for Environment and Climate Action (Life) Dedicated to Energy Efficiency Investments: the Private Finance for Energy Efficiency (PF4EE) Instrument*.
- Eichhammer, W., Fleiter, T., Hagemann, M., Hirzel, S., & Wietschel, M. (2012). *Costs and potentials of energy savings in European industry – a critical assessment of the concept of conservation supply curves*.
- Enerdata. (2012). *Energy Efficiency Trends in Buildings in the EU: Lessons from the Odyssee Mure project*. Retrieved from: <http://www.odyssee-mure.eu/publications/br/Buildings-brochure-2012.pdf>
- Enerdata & Odyssee. (2014). *Energy Efficiency Trends in Industry in the EU* [PDF document]. Retrieved from: <http://www.odyssee-mure.eu/publications/efficiency-by-sector/industry/industry-eu.pdf>
- ENERGY MANAGERS ASSOCIATION. (2014). *EEFIG – Energy Performance Contracting*.
- Energies POSIT'IF. (2013). A public ESCO for the low energy refurbishment of condominiums in Ile-de-France region, [PDF document]. Retrieved from: [http://www.eusew.eu/upload/events/516\\_7517\\_positif%20brussels%2027%20june.pdf](http://www.eusew.eu/upload/events/516_7517_positif%20brussels%2027%20june.pdf)
- EPISCOPE. (2014). *IEE Project EPISCOPE* [Website]. Retrieved from: [www.episcope.eu](http://www.episcope.eu)
- EPRA. (2014). *Monthly statistical bulletin: Oct 2014*. Retrieved from: [http://www.epra.com/media/Monthly\\_Statistical\\_Bulletin\\_October\\_2014\\_1414927075752.pdf](http://www.epra.com/media/Monthly_Statistical_Bulletin_October_2014_1414927075752.pdf)
- Ernst & Young. (2013). *Kosten-Nutzen-Analyse für einen flächendeckenden Einsatz intelligenter Zähler*. Retrieved from: <http://www.bmwi.de/BMWi/Redaktion/PDF/Publikationen/Studien/kosten-nutzen-analyse-fuer-flaechendeckenden-einsatz-intelligenterzaehler,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf>
- EURIMA. (2012). *Financing Mechanisms for Europe's Buildings Renovation*. Retrieved from: <http://www.climatestrategy.es/index.php?id=27>
- EuroACE. (2014). *Renovate Europe* [Website]. Retrieved from: <http://www.euroace.org/Resources/Projects/RenovateEurope.aspx>
- Eurobank. (2014). *Green Loans – Residential Energy Efficiency Financing in Buildings - Drivers & Obstacles* [Presentation].

- EUROCHAMBRES. (2014). Obstacles to Invest in EE: Eurochambres Survey 2009, n=2154 businesses from 12 European countries [Slide #9]. Retrieved from: [http://www.fedarene.org/wp-content/uploads/2014/05/Eurochambres\\_Energy-Efficiency-in-the-SME-sector.pdf](http://www.fedarene.org/wp-content/uploads/2014/05/Eurochambres_Energy-Efficiency-in-the-SME-sector.pdf)
- European Central Bank. (2014). *DECISION OF THE EUROPEAN CENTRAL BANK of 19 November 2014 on the implementation of the asset-backed securities purchase programme*. (ECB/2014/45). Retrieved from: [https://www.ecb.europa.eu/ecb/legal/pdf/en\\_ecb\\_2014\\_45\\_f\\_sign.pdf](https://www.ecb.europa.eu/ecb/legal/pdf/en_ecb_2014_45_f_sign.pdf)
- European Commission (DG Energy) (2013). *Energy Performance Certificates in buildings and their impact on transaction prices and rents in selected EU countries*. Retrieved from: [http://ec.europa.eu/energy/efficiency/buildings/doc/20130619\\_energy\\_performance\\_certificates\\_in\\_buildings.pdf](http://ec.europa.eu/energy/efficiency/buildings/doc/20130619_energy_performance_certificates_in_buildings.pdf)
- European Commission. (2014). *A Partial and Fragile Recovery: Annual Report on European SMEs 2013/2014 Final Report*. Retrieved from: [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2014/annual-report-smes-2014\\_en.pdf](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2014/annual-report-smes-2014_en.pdf)
- European Commission. (2014). *Building data*.
- European Commission. (2014). *Compliance-checking and enforcement of building regulations*.
- European Commission. (2014). *Energy Economic Developments in Europe: European Economy 1/2014*. Retrieved from: [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2014/pdf/ee1\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2014/pdf/ee1_en.pdf)
- European Commission. (2014). *Energy Efficiency Plan* [Website]. Retrieved from: [http://ec.europa.eu/energy/efficiency/action\\_plan/action\\_plan\\_en.htm](http://ec.europa.eu/energy/efficiency/action_plan/action_plan_en.htm)
- European Commission. (2014). *Guidance for Beneficiaries of European Structural and Investment Funds and related EU instruments*. Retrieved from: [http://ec.europa.eu/contracts\\_grants/pdf/synergies\\_beneficiaries\\_en.pdf](http://ec.europa.eu/contracts_grants/pdf/synergies_beneficiaries_en.pdf)
- European Commission. (2014). *The Impact of Accounting Rules and Practices on Resource Efficiency in the EU*.
- European Commission. (2005). *The new SME definition: User guide and model declaration*. Retrieved from [http://ec.europa.eu/enterprise/policies/sme/files/sme\\_definition/sme\\_user\\_guide\\_en.pdf](http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf)
- European Commission. (2014). *Technical Guidance – Financing the energy renovation of buildings with Cohesion Policy funding*. Retrieved from: [http://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/financing\\_energy\\_renovation.pdf](http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/financing_energy_renovation.pdf)
- Eurostat. (2013). *Manual for statistics on energy consumption in households*. Retrieved from: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-GQ-13-003/EN/KS-GQ-13-003-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GQ-13-003/EN/KS-GQ-13-003-EN.PDF)
- Federal Reserve Bank of San Francisco. (2014). *Integrating Energy Efficiency into Mortgage Financing: Promising Efforts in the New York City Multifamily Building Sector*. Retrieved from: <http://www.frbsf.org/community-development/publications/community-development-investment-review/2014/march/integrating-energy-efficiency-mortgage-financing-new-york-city-multifamily-building-sector/>
- Fraunhofer-Institute for System and Innovation Research. (2009). *Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries*. Retrieved from: [http://ec.europa.eu/energy/efficiency/studies/doc/2009\\_03\\_15\\_esd\\_efficiency\\_potentials\\_final\\_report.pdf](http://ec.europa.eu/energy/efficiency/studies/doc/2009_03_15_esd_efficiency_potentials_final_report.pdf)

- Fraunhofer-Institute for System and Innovation Research (Coordinator), Enerdata, ISIS, Technical University of Vienna, & Wuppertal Institute. (2014). *Data Base on Energy Savings Potentials*. [Website]. Retrieved from: <http://www.eepotential.eu/description.php>
- Fraunhofer -Institute for System and Innovation Research & IREES. (2014). *Evaluation des Förderprogramms „Energieberatung im Mittelstand“ Schlussbericht Im Auftrag des Bundesministeriums für Wirtschaft und Energie*. Retrieved from: <http://www.bmwi.de/DE/Mediathek/publikationen,did=676870.html>
- Fraunhofer Magazine. (2014). *European Diversity*. Retrieved from: [http://www.fraunhofer.de/en/publications/fraunhofer-magazine/magazine\\_2014/Fraunhofer-magazine\\_1-2014/magazine\\_1-2014\\_32.html](http://www.fraunhofer.de/en/publications/fraunhofer-magazine/magazine_2014/Fraunhofer-magazine_1-2014/magazine_1-2014_32.html)
- Finance Watch. (2014). *A missed opportunity to revive “boring” finance? A position paper on the long term financing initiative, good securitisation and securities financing*.
- GBPN. (2012). *What is a Deep Renovation Definition?*. Retrieved from: <http://www.gbpn.org/reports/what-deep-renovation-definition-0>
- German Government - Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). & Fraunhofer Institute. (2012). *Policy Report: Contribution of Energy Efficiency Measures to Climate Protection within the European Union until 2050*. Retrieved from: [http://www.isi.fraunhofer.de/isi-wAssets/docs/e/de/publikationen/BMU\\_Policy\\_Paper\\_20121022.pdf](http://www.isi.fraunhofer.de/isi-wAssets/docs/e/de/publikationen/BMU_Policy_Paper_20121022.pdf)
- Gosnell, G., & Hepburn, C. (2014). Chapter 9: Evaluating impacts in the distant future: cost–benefit analysis, discounting and the alternatives. In G. Atkinson, M. Agarwala, S. Dietz & E. Neumayer (Eds.) *Handbook of Sustainable Development*, (pp. 140–159).
- Google. (2014). *Google to Acquire Nest*. Retrieved from: <https://investor.google.com/releases/2014/0113.html>
- Goossens, E. (2014, June 3). Green Bonds Seen Tripling to \$40 Billion on New Entrants. *Bloomberg*. <http://www.bloomberg.com/news/articles/2014-06-03/green-bonds-seen-tripling-to-40-billion-on-new-entrants>
- GPA. (2010). *Establishing the Ground Rules Property: Industry-wide Sustainability Metrics*. Retrieved from: <http://www.ukgbc.org/resources/publication/establishing-ground-rules-property-industry-wide-sustainability-metrics>
- Greater London Authority. (2014). *RE:FIT – Putting our energy into reducing yours*. Retrieved from: <http://www.london.gov.uk/priorities/environment/tackling-climate-change/energy-efficiency/refit-putting-our-energy-reducing-yours>
- Green Button Data. (2015). *Green Button*. [Website]. Retrieved from: <http://www.greenbuttondata.org/>
- Green Rating. (2014). [Website]. Retrieved from: <http://www.green-rating.com/>
- GRESB. (2013). *2013 GRESB REPORT*. Retrieved from: [http://gresb.com/content/GRESB\\_Report\\_2013\\_Singlepage\\_HR.pdf](http://gresb.com/content/GRESB_Report_2013_Singlepage_HR.pdf)
- Groom, B. Hepburn, C., Koundouri, P., & Pierce, D. (2005). Declining Discount Rates: The Long and the Short of it, *Environmental & Resource Economics*, 32, 445–493.
- Groom, B. Hepburn, C., Koundouri, P., & Pierce, D. (2003). Valuing the Future: Recent advances in social discounting, The perplexing issue of discounting. *World Economics, Volume 4-2*.



- Groupe ICF. (2011). *Schiltigheim, France Energy performance contract for 64 social dwellings*. Retrieved from: <http://www.buildup.eu/sites/default/files/content/Schiltigheim%20EPC%20-%20Detailed%20presentation.pdf>
- Hermes Real Estate. (2014). *Presentation. Impact on investment performance, driver for scaling up finance in EE and Green Building*.
- Hermes Real Estate & IIGCC. (2014). *Supply of EE finance – summary of existing types of financial instruments and EEFIG submission References*.
- HEP ESCO. (2014). [Website]. Retrieved from: <http://www.hep.hr/esco/en/aboutus/default.aspx>
- Hong, S. M., & Steadman, P. (2013). *An Analysis of Display Energy Certificate for Public Buildings, 2008 to 2012*. Retrieved from: [http://www.bartlett.ucl.ac.uk/energy/news/documents/CIBSE\\_Analysis\\_of\\_Display\\_Energy\\_Certificates\\_for\\_Public\\_Buildings.pdf](http://www.bartlett.ucl.ac.uk/energy/news/documents/CIBSE_Analysis_of_Display_Energy_Certificates_for_Public_Buildings.pdf)
- Hyland, M., Lyons, R. C., & Lyons, S. (2013). *The value of domestic building energy efficiency — evidence from Ireland*. *Energy Economics*, 40, 943-952.
- IASPlus. (2015). *IAS 17 - Leases*. [Website]. Retrieved from: <http://www.iasplus.com/en/standards/ias/ias17>
- IASPlus. (2015). *IAS 39 – Financial Instruments: Recognition and Measurement*. [Website]. Retrieved from: <http://www.iasplus.com/en/standards/ias/ias39>
- IASPlus. (2015). *IFRIC 4 – Determining Whether an Arrangement Contains a Lease*. [Website]. Retrieved from: <http://www.iasplus.com/en/standards/ifric/ifric4>
- IEA. (2011). *The boardroom perspective: how does energy efficiency policy influence decision making in industry?* Retrieved from: [https://www.iea.org/publications/freepublications/publication/Boardroom\\_perspective.pdf](https://www.iea.org/publications/freepublications/publication/Boardroom_perspective.pdf)
- IEA. (2014). *Capturing the Multiple Benefits of Energy Efficiency*.
- IEA. (2014). *Capturing the Multiple Benefits of Energy Efficiency: Roundtable on Industrial Productivity and Competitiveness Discussion Paper*. Retrieved from: [http://www.iea.org/media/workshops/2014/eeu/industry/IEA\\_Industrialnonenergybenefitsbackgroundpaper\\_FINAL.pdf](http://www.iea.org/media/workshops/2014/eeu/industry/IEA_Industrialnonenergybenefitsbackgroundpaper_FINAL.pdf)
- IEA. (2013). *Energy efficiency market report 2013 [Executive Summary]*. Retrieved from: <http://www.iea.org/Textbase/npsum/EEMR2013SUM.pdf>
- IEA. (2013). *Energy Efficiency Market Report 2013 – Market Trends and Medium-Term Prospects [Presentation 16.10.2013]*.
- IEA. (2014). *Energy Efficiency Market Report 2014 – Market Trends and Medium-Term Prospects*.
- IEA. (2014). *Energy end-use policies and programs towards industrial SMEs – the case of Japan, Belgium, Spain and Sweden” IEA IETS Annex XVI Energy Efficiency in SMEs Task I*. [PDF Document]. Retrieved from: [http://www.iea.org/media/workshops/2014/eeu/smenovworkshop/Patrik\\_Thollander\\_Session1.pdf](http://www.iea.org/media/workshops/2014/eeu/smenovworkshop/Patrik_Thollander_Session1.pdf)
- IEA. (2013). *Innovative Market Framework to enable deep renovation of existing buildings in IEA countries*. Conference paper presented at IEPEC ([www.iepec.org](http://www.iepec.org)).
- IEA. (2011). *Joint Public-Private Approaches for Energy Efficiency Finance – Policies to scale-up private sector investment*. Retrieved from: <http://www.iea.org/publications/freepublications/publication/finance-1.pdf>



- IEA. (2012). *Mobilising investment in energy efficiency – Economic instruments for low-energy buildings*. Retrieved from: [http://www.iea.org/publications/freepublications/publication/Mobilising\\_investment\\_EE\\_FINAL.pdf](http://www.iea.org/publications/freepublications/publication/Mobilising_investment_EE_FINAL.pdf)
- IEA. (2013). *Redrawing the Energy-Climate Map – World Energy Outlook Special Report*. Retrieved from: [http://www.iea.org/publications/freepublications/publication/WEO\\_Special\\_Report\\_2013\\_Redrawing\\_the\\_Energy\\_Climate\\_Map.pdf](http://www.iea.org/publications/freepublications/publication/WEO_Special_Report_2013_Redrawing_the_Energy_Climate_Map.pdf)
- IEA. (2012). *Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements*. Retrieved from: [http://www.iea.org/publications/insights/insightpublications/Spreading\\_the\\_Net\\_FINAL.pdf](http://www.iea.org/publications/insights/insightpublications/Spreading_the_Net_FINAL.pdf)
- IEA. (2014). *Special Report: World Energy Investment Outlook*. Retrieved from: <http://www.iea.org/publications/freepublications/publication/WEIO2014.pdf>
- IEA. (2014). *World Energy Investment Outlook 2014 Factsheet Overview*.
- IEA. (2014). *World Energy Model Documentation: 2014 Version*.
- IEA & Institute for Industrial Productivity. (2012). *Pathways to Energy Management Programmes-Gaining through Saving* [PDF document]. Retrieved from: [http://www.iipnetwork.org/IEAIP\\_Energymanagement\\_reinaud.pdf](http://www.iipnetwork.org/IEAIP_Energymanagement_reinaud.pdf)
- IIGCC. (2012). *Enhancing the Real Estate Sustainability Policy Framework*. Retrieved from: <http://www.mandg.co.uk/-/media/Literature/UK/Institutional/IIGCC-enhancing-the-real-estate-sustainability-policy-framework.pdf>
- IIGCC. (2013). *Protecting value in real estate - Managing investment risks from climate change*. Retrieved from: [http://www.iigcc.org/files/publication-files/IIGCC\\_Protecting\\_Value\\_in\\_Real\\_Estate.pdf](http://www.iigcc.org/files/publication-files/IIGCC_Protecting_Value_in_Real_Estate.pdf)
- IIGCC & UNEP FI. (2014). *Existing sector led sustainability tools*.
- INSPIRE. (2010). *D2.8.III.2 Data Specification on Buildings – Technical Guidelines*. Retrieved from: [http://inspire.jrc.ec.europa.eu/documents/Data\\_Specifications/INSPIRE\\_DataSpecification\\_BU\\_v3.0.pdf](http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_BU_v3.0.pdf)
- Institut der deutschen Wirtschaft Köln. (2013). *IW-Umweltexpertenpanel 2013: Umwelt- und Energiepolitik im Meinungsbild der Wirtschaft*. Retrieved from: <http://www.iwkoeln.de/en/studien/gutachten/beitrag/hendrik-biebeler-iw-umweltexpertenpanel-2013-144512>
- Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database*. [Website]. Retrieved: <http://iepd.iipnetwork.org/>
- Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database: AU-5: Energy Efficiency Opportunities Program (EEO)*. Retrieved from: <http://iepd.iipnetwork.org/policy/energy-efficiency-opportunities-program-eeo>
- Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database: GE-2: Voluntary agreements with German industry*. Retrieved from: <http://iepd.iipnetwork.org/policy/voluntary-agreements-german-industry>
- Institute for Industrial Productivity. (2015). *Industrial Efficiency Policy Database: Pulp and Paper*. [Website]. Retrieved from: <http://ietd.iipnetwork.org/content/pulp-and-paper#benchmarks>
- Institute for Industrial Productivity. (2013). *Large-scale adoption of energy management systems: global energy efficiency programme insights*. Retrieved from: [http://www.iipnetwork.org/EnMS\\_10pager\\_memo.pdf](http://www.iipnetwork.org/EnMS_10pager_memo.pdf)

- ING. (2013). *Energy efficiency is widely regarded as “low-hanging-fruit” but many financial barriers exist that prevent money from flowing into the industry* [Slide]. Retrieved from: [http://www.ing.nl/Images/EBZ\\_ING-Saving\\_Energy\\_in\\_the\\_Netherlands-May\\_2013\\_tcm7-134961.pdf?id=20130825072514](http://www.ing.nl/Images/EBZ_ING-Saving_Energy_in_the_Netherlands-May_2013_tcm7-134961.pdf?id=20130825072514)
- Investor Confidence Project. (2014). *Enabling Markets for Energy Efficiency Investment* [Website]. Retrieved from: <http://www.eepformance.org/>
- Irish Government - Department of Communications, Energy and Natural Resources & Sustainable Energy Authority of Ireland. (2014). *Review and Cost Benefit Analysis of the Accelerated Capital Allowances scheme for Energy Efficient Equipment*. Retrieved from: [http://www.seai.ie/Publications/Your\\_Business\\_Publications/Large\\_Energy\\_Users/Review-and-Cost-Benefit-Analysis-of-the-ACA-scheme-for-EE-Equipment.pdf](http://www.seai.ie/Publications/Your_Business_Publications/Large_Energy_Users/Review-and-Cost-Benefit-Analysis-of-the-ACA-scheme-for-EE-Equipment.pdf)
- JLL. (2014). *Real Estate Environmental Benchmark: An initiative by JLL and Better Buildings Partnership*. Retrieved from: <http://www.joneslanglasalle.co.uk/UnitedKingdom/EN-GB/Pages/Real-Estate-Environmental-Benchmark.aspx>
- Johnson Controls. (2013). *Setting the PACE: Financing Commercial Retrofits*. Retrieved from: <http://www.institutebe.com/InstituteBE/media/Library/Resources/Financing%20Clean%20Energy/Setting-the-PACE-Financing-Commercial-Retrofits.pdf>
- Kasprowicz, R. (2015). *Der Energieeffizienz-Index der deutschen Industrie, Fachzeitschrift Technik in Bayern*.
- KfW. (2013). *Energiekosten und Energieeffizienz im Mittelstand*. Retrieved from: <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-Nr.-40-Dezember-2013-Energieeffizienz-im-Mittelstand.pdf>
- KfW. (2013). *Energiekosten und Energieeffizienz im Mittelstand*. Retrieved from: <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-Nr.-40-Dezember-2013-Energieeffizienz-im-Mittelstand.pdf>
- Kidney, S. (2015). Île-de-France issues EUR 600m( \$830m), 12yr, AA+ Green Muni. They had so many orders in one hour they upped it from 350m to 600m!. *Climate Bonds Initiative*. Retrieved from: <http://www.climatebonds.net/2014/05/%C3%AEile-de-france-issues-eur600m-830m-12yr-aa-green-muni-they-had-so-many-orders-one-hour>
- KPMG. (2013). *European Responsible Investing Fund Survey 2013*. Retrieved from: <http://www.kpmg.com/LU/en/IssuesAndInsights/Articlespublications/Documents/European-Responsible-Investing-Fund-Survey-2013.pdf>
- KREDEX. (2013). *Financing housing in Estonia*.
- Kuckshinrichs et al. (2012). STE Research Report, Wirkungen der Förderprogramme “Energieeffizientes Bauen”, „Energieeffizient Sanieren“ und „Energieeffiziente Infrastruktur“ der KfW auf öffentliche Haushalte: Förderjahr 2011, FZ Jülich. Retrieved from [https://www.kfw.de/KfW-Konzern/Service/Download-Center/Konzernthemen-\(D\)/Research/Evaluationen/Evaluationen-Energieeffizient-Bauen-und-Sanieren/#](https://www.kfw.de/KfW-Konzern/Service/Download-Center/Konzernthemen-(D)/Research/Evaluationen/Evaluationen-Energieeffizient-Bauen-und-Sanieren/#)
- Land, J. (2014, September 14). Housing association issues sector’s ‘first green bond’. *Dash*. Retrieved from: <http://www.24dash.com/news/housing/2014-09-09-Housing-associations-issues-sectors-first-green-bond>
- Ley, E. *On the Improper use of the Internal Rate of Return in Cost-Benefit Analysis*, World Bank Institute, Washington D.C., 2007

- Linköping University – Department of Computer and Information Science. (2014). *DEFRAM – A database for facilitating better energy efficiency assessments and improvements*. [Website]. Retrieved from: <http://www.ida.liu.se/~evabl45/defram.en.shtml>
- ManagEnergy. (2013). *Barriers and Drivers for Energy Performance Contracting in Europe – what is the feedback from the ManagEnergy workshops?*
- Millin, C., & Bullier, A. (2011). *Energy refurbishment of social housing using energy performance contract*. Retrieved from: [http://proceedings.eceee.org/papers/proceedings2011/5-050\\_Milin.pdf?returnurl=http%3A%2F%2Fproceedings.eceee.org%2Fvisabstrakt.php%3Fevent%3D1%26doc%3D5-050-11](http://proceedings.eceee.org/papers/proceedings2011/5-050_Milin.pdf?returnurl=http%3A%2F%2Fproceedings.eceee.org%2Fvisabstrakt.php%3Fevent%3D1%26doc%3D5-050-11)
- Moore, M. A., Boardman, A. E., Vining, A. R., Weimer, D. L. and Greenberg, D. H. (2004), “Just give me a number!” Practical values for the social discount rate. *J. Pol. Anal. Manage.*, 23: 789–812. doi: 10.1002/pam.20047
- MunchenerHyp. (2014). *Press Release: Capital market premiere: MünchenerHyp issues the first sustainable Mortgage Pfandbrief*. Retrieved from: [http://www.muenchenerhyp.de/en/\\_downloads/press/releases14/Press\\_Release\\_MuenchenerHyp\\_ESG\\_Pfandbrief.pdf](http://www.muenchenerhyp.de/en/_downloads/press/releases14/Press_Release_MuenchenerHyp_ESG_Pfandbrief.pdf)
- Notaires de France. (2013). *Valeur verte des logements d’après les bases Notariales BIEN et PERVAL* [Website]. Retrieved from: <http://www.notaires.fr/fr/la-valeur-verte-des-logements>
- NRW.BANK. (2012). *Bottrop InnovationCity - Nutzungsoptimierung und energetische Erneuerung in EFH-Gebieten der 1950er bis 1970er Jahre - Ein Beitrag zur Stärkung der Innenentwicklung und energetischen Sanie-rung von Städten und Gemeinden*.
- OECD. (2006). *Working Party on National Environmental Policy: Use of Discount Rates in the Estimation of the Costs of Inaction with Respect to Selected Environmental Concerns*.
- Office of Energy Efficiency & Renewable Energy. (2014). *Buildings Performance Database* [Website]. Retrieved from: <http://energy.gov/eere/buildings/buildings-performance-database>
- OgilvyEarth. (2010). *Quantitative Research of CEOs/Senior Level Executives Participating in the Energy Efficiency Opportunities Program*. Retrieved from: <http://eex.gov.au/files/2012/01/Ogilvy-Earth-CEO-Report.pdf>
- OJ L 271/16, 12.9.2014. Retrieved from: [http://www.seupb.eu/Libraries/2014-2020\\_Programmes/964-2014\\_ImplementingReg\\_FinancialInstruments.sflb.ashx](http://www.seupb.eu/Libraries/2014-2020_Programmes/964-2014_ImplementingReg_FinancialInstruments.sflb.ashx)
- OSER. (2014). *Innovative financing for energy and renewables: feedback from successful projects*. [PDF documents]. Retrieved from: [http://managenergy.net/lib/documents/1218/original\\_Pr%C3%A9sentation\\_Bruxelles\\_081014\\_VA\\_OSER.pdf?1412843690](http://managenergy.net/lib/documents/1218/original_Pr%C3%A9sentation_Bruxelles_081014_VA_OSER.pdf?1412843690)
- OSER. (2014). *SPL-OSER, l’efficacité énergétique en Rhône-Alpes*. Retrieved from: <http://spl-oser.fr/>
- Peterborough City Council. (2014). *Housing*. Retrieved from: <http://www.peterborough.gov.uk/housing.aspx>
- Prognos. (2010). *Rolle und Bedeutung von Energieeffizienz und Energiedienstleistungen in KMU*. Retrieved from: [http://www.prognos.com/fileadmin/pdf/publikationsdatenbank/Prognos\\_Rolle\\_und\\_Bedeutung\\_von\\_Energieeffizienz\\_und\\_Energiedienstleistungen\\_in\\_KMU.pdf](http://www.prognos.com/fileadmin/pdf/publikationsdatenbank/Prognos_Rolle_und_Bedeutung_von_Energieeffizienz_und_Energiedienstleistungen_in_KMU.pdf)

- RE:FIT PROGRAMME. (2014). Setting Up and Managing a City Energy Performance Programme. [PDF document]. Retrieved from: [http://managenergy.net/lib/documents/1221/original\\_REFIT\\_-\\_Tristan\\_Oliver.pdf?1412843780](http://managenergy.net/lib/documents/1221/original_REFIT_-_Tristan_Oliver.pdf?1412843780)
- Real World Planning. (2011). *Debrief of qualitative research into communication of the Green Deal* [Presentation 12.12.2011].
- Real World Planning. (2012). *Presentation. Debrief of qualitative research into 'the Green Switchover': amongst consumers and stakeholders* [Presentation 30.12.2012].
- RICS. (2014). *CSR as a driver for large-scale uptake of EE*.
- Rijksoverheid. (2014). *Puntensysteem en energielabel* [Website]. Retrieved from: <http://www.rijksoverheid.nl/onderwerpen/huurwoning/puntensysteem-huurwoning/puntensysteem-en-energielabel>
- Ristori, D. (2013). *JRC Conference on "Scientific Support to EU Growth and Jobs: Efficient buildings, vehicles and equipment* [Introductory Remarks]. Retrieved from: [http://ec.europa.eu/dgs/jrc/index.cfm?id=2470&obj\\_id=4330&dt\\_code=EVN](http://ec.europa.eu/dgs/jrc/index.cfm?id=2470&obj_id=4330&dt_code=EVN)
- THE ROCKFELLER FOUNDATION & DB Climate Change Advisors. (2012). *United States Building Energy Efficiency Retrofits – Market Sizing and Financing Models*. Retrieved from: <http://www.rockefellerfoundation.org/uploads/files/791d15ac-90e1-4998-8932-5379bcd654c9-building.pdf>
- Ründiger, A. (2013). *La rénovation thermique des bâtiments en France et en Allemagne: quels enseignements pour le débat sur la transition énergétique* (Working Paper). Retrieved from: [http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/WP0713\\_AR\\_renovation%20energetique%20France-Allemagne.pdf](http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/WP0713_AR_renovation%20energetique%20France-Allemagne.pdf)
- Rutgers University. (2014). *Industrial Assessment Centers Database* [Website]. Retrieved from: <http://iac.rutgers.edu/database/>
- RWE stiftung. (2013). *Energiebildung in Deutschland*. Retrieved from: [http://flash.rwe.com/bkm/Stiftung\\_PDF\\_Mai\\_2013/blaetterkatalog/blaetterkatalog/pdf/complete.pdf](http://flash.rwe.com/bkm/Stiftung_PDF_Mai_2013/blaetterkatalog/blaetterkatalog/pdf/complete.pdf)
- Sauer, A. & Mandel, J (2013). *Der neue Energieeffizienz-Index – EEI: Entwicklung der Energieeffizienz in der Produzierenden Industrie*. In: Werkstattstechnik online Jahrgang 103. (2013). H. 5, p. 437-443.
- SCA. (2015). *SCA first Swedish listed company to issue green bond*. [Website]. Retrieved from: <http://www.sca.com/en/Media/Press-releases/Press-releases/2014/SCA-first-Swedish-listed-company-to-issue-green-bond/>
- Schneider Electric. (2014). Several “Success Stories” Series documents [PDF document].
- Scofield, J. H. (2013). *Efficacy of LEED-certification in reducing energy consumption and greenhouse gas emission for large New York City office buildings, Energy and Buildings, 67, 517-524*.
- Seifried, S. (2001). *The "ECO-Watt Project": building a Negawatt power plant in a school*. Retrieved from: [http://www.ecee.org/library/conference\\_proceedings/ecee\\_Summer\\_Studies/2001/Panel\\_5/p5\\_12](http://www.ecee.org/library/conference_proceedings/ecee_Summer_Studies/2001/Panel_5/p5_12)
- Sullivan, R., Gouldson, A., & Webber, P. (2012). Funding low carbon cities: local perspectives on opportunities and risks. *Climate Policy, 13(4)*, 514-529.
- SWD(2014) 20 - Report on energy prices and costs. Retrieved from: [http://ec.europa.eu/clima/policies/2030/documentation\\_en.htm](http://ec.europa.eu/clima/policies/2030/documentation_en.htm)

- Swiss Re. (2013). *Mind the risk – A global ranking of cities under threat from natural disasters*. Retrieved from: [http://media.swissre.com/documents/Swiss\\_Re\\_Mind\\_the\\_risk.pdf](http://media.swissre.com/documents/Swiss_Re_Mind_the_risk.pdf)
- TiasNimbas. (2014). *Energy label increases home sales in the Netherlands* [Web log comment]. Retrieved from: <http://knowledge.tiasnimbas.edu/artikel/energy-label-increases-home-sales-netherlands>
- TrainRebuild. (2012). *Retrofitting buildings, training and improved skills, and financing energy efficiency in buildings*.
- Triple E Consulting. (2014). *Market study for a voluntary common European Union certification scheme for the energy performance of non-residential buildings*.
- UK Government. (2015). *Policy: Reducing demand for energy from industry, business and the public sector* [Website]. Retrieved from: <https://www.gov.uk/government/policies/reducing-demand-for-energy-from-industry-businesses-and-the-public-sector--2/supporting-pages/crc-energy-efficiency-scheme>
- UKGBC. (2014). *Green Deal Finance – Examining the Green Deal interest rate as a barrier to take-up*. Retrieved from: <http://www.ukgbc.org/resources/publication/uk-gbc-task-group-report-green-deal-finance>
- UNEP (2013). *The Emissions Gap Report 2013: A UNEP Synthesis Report*. Retrieved from: <http://www.unep.org/pdf/UNEPemissionsGapReport2013.pdf>
- UNEP. (2014). *Sustainability Metrics: Translation and Impact on Property Investment and Management*. Retrieved from [http://www.unepfi.org/fileadmin/documents/UNEPFI\\_SustainabilityMetrics\\_Web.pdf](http://www.unepfi.org/fileadmin/documents/UNEPFI_SustainabilityMetrics_Web.pdf)
- UNEP FI. (2014). *Commercial Real Estate - Unlocking the energy efficiency retrofit investment opportunity*. Retrieved from: [http://www.unepfi.org/fileadmin/publications/investment/Commercial\\_Real\\_Estate.pdf](http://www.unepfi.org/fileadmin/publications/investment/Commercial_Real_Estate.pdf)
- UNEP FI. (2014). *Energy Efficient Measures in Building Retrofits Can Deliver Increased Profits and Address Climate Change*. Retrieved from: <http://www.unep.org/newscentre/Default.aspx?DocumentID=2762&ArticleID=10721>
- UNEP FI (2014). *Unlocking the energy efficiency retrofit opportunity*. Retrieved from: [http://www.unepfi.org/fileadmin/publications/investment/Commercial\\_Real\\_Estate.pdf](http://www.unepfi.org/fileadmin/publications/investment/Commercial_Real_Estate.pdf)
- UNIDO. (2011). *Barriers to industrial energy efficiency: a literature review*. Retrieved from: [http://www.unido.org/fileadmin/user\\_media/Publications/Research\\_and\\_statistics/Branch\\_publications/Research\\_and\\_Policy/Files/Working\\_Papers/2011/WP102011%20Barriers%20to%20Industrial%20Energy%20Efficiency%20-%20A%20Literature%20Review.pdf](http://www.unido.org/fileadmin/user_media/Publications/Research_and_statistics/Branch_publications/Research_and_Policy/Files/Working_Papers/2011/WP102011%20Barriers%20to%20Industrial%20Energy%20Efficiency%20-%20A%20Literature%20Review.pdf)
- US Department of Energy-Office of Energy Efficiency & Renewable Energy. (2014). *CHP Project Profiles Database*. [Website]. Retrieved from: <http://www.energy.gov/eere/amo/chp-deployment>
- Van der Hoeven, M. (2013). Visualising the ‘hidden’ fuel of energy efficiency: Energy Efficiency Simply Makes Sense. *IEA Energy*, 4.
- WEF. (2011). *A Profitable and Resource Efficient Future: Catalysing Retrofit Finance and Investing in Commercial Real Estate*. Retrieved from: [http://www3.weforum.org/docs/WEF\\_IU\\_CatalysingRetrofitFinanceInvestingCommercialRealEstate\\_Report\\_2011.pdf](http://www3.weforum.org/docs/WEF_IU_CatalysingRetrofitFinanceInvestingCommercialRealEstate_Report_2011.pdf)
- World Business Council for Sustainable Development. (2009). *Energy Efficiency in Buildings: Transforming the Market*. Retrieved from: <http://www.wbcsd.org/transformingthemarketeeb.aspx>

WorldSteel Association. (2014). Workshops and Benchmarking: Worldsteel safety and technical workshop. [Website]. Retrieved from: <http://www.worldsteel.org/steel-by-topic/technology/workshops-and-benchmarking.html>

WSBF. (2013). *Building Efficiency – Reducing Energy Demand in the Commercial Sector*. Retrieved from: [http://www.policyconnect.org.uk/wsbf/sites/site\\_wsbf/files/report/403/fieldreportdownload/wsbfreport-buildingefficiencypdf.pdf](http://www.policyconnect.org.uk/wsbf/sites/site_wsbf/files/report/403/fieldreportdownload/wsbfreport-buildingefficiencypdf.pdf)