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Clean Energy Cooperation with India (CECI): Legal and policy support to the development and implementation of energy efficiency legislation for the building sector in India (ACE: E^2)

Specific Contract: FWC No. PI / 2015 / 368-474

Financial/ market instruments and promotional, information and awareness campaigns

EU EXPERIENCE ON EPBD - POSITION PAPER No 11

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FOREWORD

This position paper has been developed by the project "Clean Energy Cooperation with India (CECI): Legal and policy support to the development and implementation of energy efficiency legislation for the building sector in India ("ACE:E²"[1])".

The ACE: E² project is financed by the European Union and managed by the Delegation of the European Union to India. It is carried out as part of the Framework Contract COM 2011 Lot 1 (Europeaid/129783) by EXERGIA S.A., member of SACO Consortium, in collaboration with PricewaterhouseCoopers (PwC) India, under the Specific Contract: FWC No. PI / 2015 / 368-474 signed between the Delegation of the European Union to India (EUD) and SACO on December 18th, 2015.

The contents of this paper are, however, the sole responsibility of the contractor and can in no way be taken to reflect the views of any particular individual or institution, including the European Union, the Delegation of the European Union to India, and the Bureau of Energy Efficiency (BEE) in India.

[1] ACE: E² – Adoption, Compliance, Enforcement – Energy Efficiency

ABBREVIATIONS

ACE: E2	Acronym of the project (Adoption, Compliance, Enforcement – Energy Efficiency)
CECI	Clean Energy Cooperation with India
CHP	Combined Heat and Power
DEEP	De-risking Energy Efficiency Platform
ECBC	Energy Conservation Building Code
EEFIG	Energy Efficiency Financial Institution Group
EEO	Energy Efficiency Obligation
EP	Energy Performance
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
ESCO	Energy Service Company
EU	European Union
EUD	European Union to India
IPMVP	International Protocol for Measurement & Verification (M&V) of Performance
M&E	Monitoring and Evaluation
M&V	Measurement & Verification
NZEB	Nearly Zero Energy Buildings

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SUMMARY

Finance, information and coordination are vital elements within the roadmaps to NZEB, for both new and renovation construction, in order to deliver on EU policy targets for energy efficient buildings, both newbuild and renovation. In particular, a major upscaling of financial investment, at least to four times its traditional level, is required in energy efficiency renovation of buildings to ambitious ('deep') standards.

However, there are many challenges and barriers to be tackled in order to achieve this ambition. It requires activation of the key decision makers, namely building owners and financial institutions, which involves tools, guidance and supports to improve or highlight the feasibility of an energy efficiency upgrading project and to gain the confidence to commit to such investment. A particular challenge is that national authorities and energy experts working on technical building codes and other issues often do not possess in-depth knowledge and understanding of the language and processes (notably perspectives on risk) of the financial services community. Similarly, the finance and banking sector is usually unfamiliar with the challenges of many energy efficiency measures. Addressing and bridging this gap has been – and remains - an essential issue in order to enable national authorities and energy experts to engage most effectively with the finance and banking sector.

At EU and individual Member State levels, an extensive set of initiatives is being taken to address these needs as a matter of priority. A report by the Energy Efficiency Financial Institution Group (EEFIG) in 2015 recommended a range of actions that could help overcome the current challenges to obtaining long-term financing for energy efficiency. This work has laid the basis for further work with the financial challenges related to building renovation across Europe. Major sources of 'wholesale' finance are available for combined financing of funding schemes at a 'retail' level of building owners to avail of.

A wide range of financial and related instruments is available to mobilise the market in EU Member States. The most common have been capital grants/ subsidies and soft loans for energy efficiency upgrading measures in existing buildings or, to a lesser extent, in new building designs. Other methods include guarantees and third-party financing through mechanisms such as Energy Services Companies with energy performance contracting and Energy Supplier Obligations. While grant incentives and tax reliefs remain prominent, there is a major drive across many Member States to migrate towards leveraging 'market based' financial instruments, involving a creative blending of central EU, Member State exchequer and private sector finance. Examples of good guidance and case examples in relation to the design of such instruments and delivery mechanisms (policies, programmes, partnerships, schemes) are signposted in the paper.

In this regard, improved coordination systems and synergies are important among the 'orchestra' of national institutions responsible for implementing energy efficiency policy, covering not just financial and promotional aspects but also supporting regulatory and developmental initiatives. Within such a system, energy performance certification (EPC) labelling of buildings is a potentially significant informational instrument to stimulate energy performance upgrading decisions. All EU Member States have established extensive EPC systems for both new and existing residential and non-residential buildings.

Particular emerging ingredients for stimulating the market are:

- **Financing options** – favourable loans/ green mortgages, ESCOs/ Public-Private Partnerships, Energy Performance Contracting, guarantees, tax reliefs.
- **One Stop Shops** – providing practical information, advice and guidance to assist decision makers (building owners or investors) in relation to procurement, installation and service;
- **Packaging of measures** – clear and attractive energy efficiency product offerings, and highlighting the benefits – including energy efficiency as a key quality and value factor;

These need to be appropriately attuned to the diverse circumstances of the commercial, public and residential building sectors. No single "silver bullet" for energy efficiency finance solutions exists due to the complex nature of the sector and its needs.

To sum up: The complex arena of support measures is a formidable challenge. A key success factor is the role of policy authorities in providing the focus, coherence and specific interventions to stimulate and sustain market confidence and commitment. Each Member State has more than one type of financial instrument to stimulate energy efficiency in buildings. While grants and subsidies will continue to have a role, a key strategic focus is on migrate from capital grant based supports to more sustainable market based alternatives. Information campaigns and resources have an important accompanying role in creating and maintaining awareness.

It is hoped that the EU approaches and experiences outlined in this paper will help to inform India's consideration of similar issues and challenges in improving the energy performance of its building stocks.

1 INTRODUCTION

In tackling the strategic Energy Performance of Buildings Directive recast of 2010 (EPBD, 2010/31/EU) goal of transforming the EU building stock, Member States face many barriers – technological, skills related, economic, informational, financial, legal or regulatory, organisational and marketing related. Within this arena, a key focus has been on tackling the financial and informational barriers to energy efficiency action by building owners, investors and users.

Article 10 of the Directive is concerned with financial incentives and market barriers. It sets complementary obligations on the EU Commission to assist Member States in setting up financial support programmes and to analyse the effectiveness of the national supports. Article 20 relates to the provision of information to owners and tenants of buildings on the different methods and practices for improving energy performance. Member States are also required to ensure that guidance and training are made available to those responsible for implementing the Directive, with central E

It has been estimated that the annual investment in the energy renovation of the building stock will need to grow from €12 billion to €60 billion in order to meet EU targets, including the requirement regarding energy renovation of buildings. Such a market transformation and upscaling of activity requires an unprecedented mobilisation of policy and market actors, in order to tackle the various barriers to decision and action in a co-ordinated way. Comparable challenges apply to the delivery of nearly zero energy buildings (NZEB) standards for new buildings.

Reflected in the focus of this Position Paper, two particular requirements have been identified as vital: firstly, insight and understanding of the attitudes and motives of building owners and investors, and secondly, the availability of suitable finance. Regarding the motives and decision-making processes of these parties, energy efficiency is not often the main argument and there are different perspectives from different stakeholders. Thus, there is a need for information to be configured in a versatile way for different decision makers. For building owners, it may be an overall upgrading of building quality and asset value, improved productivity or comfort, while for governments it may be employment content or health benefits as well as climate policy advancement.

This position paper outlines activities within EU Member States and at central EU level in relation to these two sets of issues. These include the following aspects:

- Overview and mapping of barriers and available support initiatives.
- Profiles of types of financial instruments and their deployment in EU countries.
- The process of mobilising upscaled investment in energy efficiency building upgrades.
- Accessing, mobilising and leveraging complementary EU, national/regional and private sector finance.
- Communicating and working with financial institutions.
- Role of Energy Service Companies (ESCOs).
- Role of Energy Efficiency Obligation initiatives.
- Informational initiatives, including energy performance labels and ‘one stop shops’.
- Monitoring and evaluation of policies, programmes, schemes and projects.

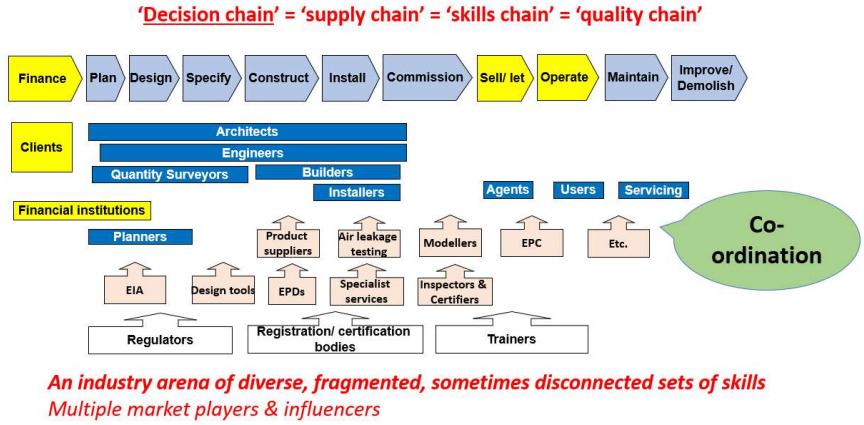
A note on language: In the present context, the term 'Finance' covers both incentives from public sources ('free' or 'cheap' finance) and also the majority of the investment (matching finance) drawn from various funding sources, including a contribution from the building owner's own funds where applicable.

2 OVERVIEW OF POLICY & MARKET CONTEXT: THE ARENA AND CHALLENGE

2.1 The market arena

The task of achieving a consistent upgrading of the energy performance of the building sector is indicated by the parties shown in the yellow boxes of Figure 2-1. In relation to the commitment to investing in improved energy performance of buildings these parties are the key decision makers at whom both financial and promotional initiatives need to be targeted.

Figure 2-1 The 'Decision chain' = Supply chain



2.2 Barriers to investment action on energy efficiency

A summary of barriers to market action on energy efficiency in buildings is given in Figure 2-2, consisting of technical, regulatory, informational, financial and other market barriers. If not addressed systematically, any one or more of these barriers can deter key decision makers from making the investment commitment. Many of these barriers are mutually interacting. Indeed, barriers can add to the cost of borrowing and if not addressed, can make energy efficiency upgrades less attractive economically. For example, it can lead to available capital being devoted to other more visible priorities, even where low interest finance is available for energy efficiency improvements.

Regarding information, the lack of trusted, relevant information and uncertainties in energy saving investments add a 'risk premium' to investments. For financiers, the relatively small scale (from a financial institutional perspective), dispersed nature of energy efficiency investments creates high transaction costs, unless resources can be pooled to enable access to capital in a number of ways: by aggregating projects, obliging energy suppliers to promote energy efficiency improvements; through a large government backed fund dedicated for efficiency investment; or through an ESCO model.

Figure 2-2 Overview of barriers to energy efficiency upgrading of buildings

Market	• Market organisation and price distortions prevent customers from appraising the true value of energy efficiency. • Split incentive problems created when investors cannot capture the benefits of improved efficiency (IEA 2007a). • Transaction costs (project development costs are high relative to energy savings).
Financial	• Up-front costs and dispersed benefits discourage investors • Perception of EE investments as complicated and risky, with high transaction costs • Lack of awareness of financial benefits on the part of financial institutions.
Information and awareness	• Lack of sufficient information and understanding, on the part of consumers, to make • rational consumption and investment decisions.
Regulatory and institutional	• Energy tariffs that discourage EE investment (such as declining block prices). • Incentive structures encourage energy providers to sell energy rather than invest in cost-effective energy efficiency. • Institutional bias towards supply-side investments.
Technical	• Lack of affordable energy efficiency technologies suitable to local conditions. • Insufficient capacity to identify, develop, implement and maintain EE investments.

Source: International Energy Agency

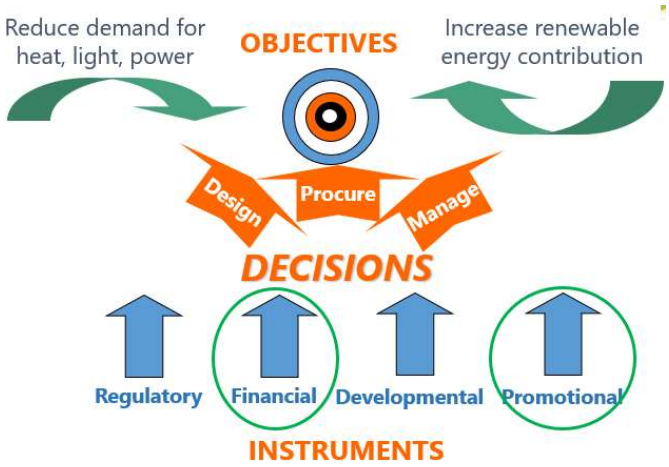
Figure 2-3 similarly summarises these sets of barriers, including skills throughout the supply chain and a lack of co-ordinated solutions to give building owners confidence. For each of these barriers there are corresponding ingredients for success, including the key role of policy co-ordination and orchestrated interventions to stimulate and sustain market confidence and commitment.

Figure 2-3 Barriers to energy efficiency upgrading

2.3 Policy instruments for energy efficiency

Figure 2-4 summarises the role of the four types of generic policy instruments which can be mobilised to overcome the above barriers – Regulatory, Financial, Developmental and Promotional. The focus of this paper is on activities within the groups of Financial and Promotional instruments.

Figure 2-4 The four groups of policy instruments



An example a suite of policy instruments in one EU Member State, which is dominated by instruments being applied in the commercial and residential buildings sectors, is shown in Figure 2-5.

Figure 2-5 Example of a range of policy/ market instruments

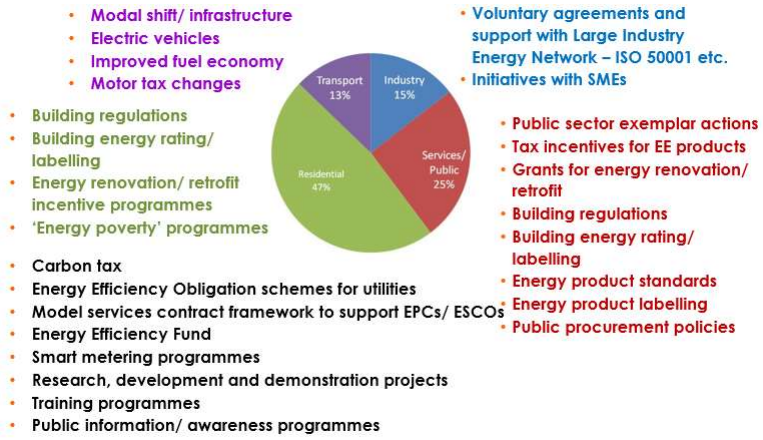
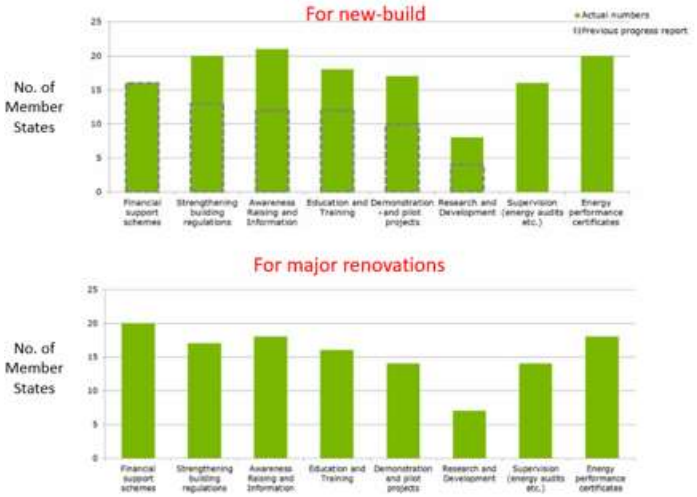


Figure 2-6 is a profile of policies and measures being applied by Member States in support of energy efficient buildings, similar for both for newbuild and renovation.

Figure 2-6 Member State policies and measures supporting energy efficient buildings



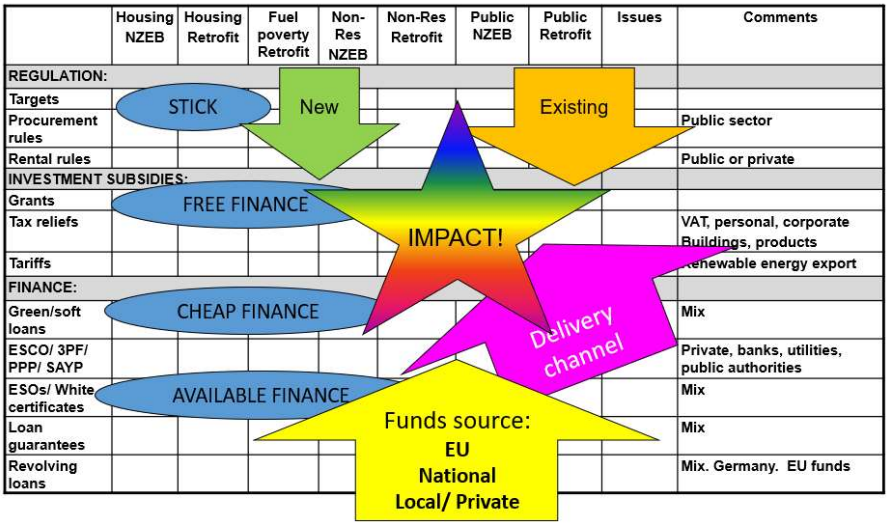
3 FORMS & APPLICATION OF INSTRUMENTS

3.1 Profiling of financial instruments

3.1.1 Mapping of financial instruments

Figure 3-1 is an overview matrix of the arena for deployment of differing types of financial instrument available for application in the different building sectors. Types of financial instrument can be categorised as: 'free finance' (grants, subsidies, tax breaks), 'cheap finance' (favourable loan levels, interest rates), and accessible finance (banks, Energy Service Companies (ESCOs) and other Public Private Partnerships (PPPs), third parties), accompanying confidence building measures (guarantees, official securities). For completeness, the matrix also includes regulatory instruments which can have the effect of being a facilitator of action or a deterrent of inaction.

Figure 3-1 Overview of main groupings of financial instrument



Various bodies can play different roles as sources of finance:

- initiatives from public or private financial institutions - EU, national, regional, local authorities and private
- initiatives from suppliers of energy efficient products or services;
- initiatives from real estate agents, social housing companies or building companies;
- information initiatives that improve the knowledge on the Energy Performance Certificate (EPC);
- governmental initiatives.

3.1.2 Forms of financial instrument

There is an extensive menu of potential financial instruments:

- Grants

- Loans
- Interest rate subsidies
- Guarantees
- Venture capital (equity) invested in energy efficiency funds (for targeting at commercial or public sector buildings, for example)
- Equity
- Energy performance contracting Model services contract framework to support EPCs/ ESCOs
- Energy Efficiency Obligation schemes for utilities (energy 'white certificates')
- Energy Efficiency Fund
- Developmental infrastructure – e.g. smart metering programmes
- Research, development and demonstration projects
- Training programmes
- Public information/ awareness programmes
- Demonstration projects/ Case examples (funded under national or EU programmes)

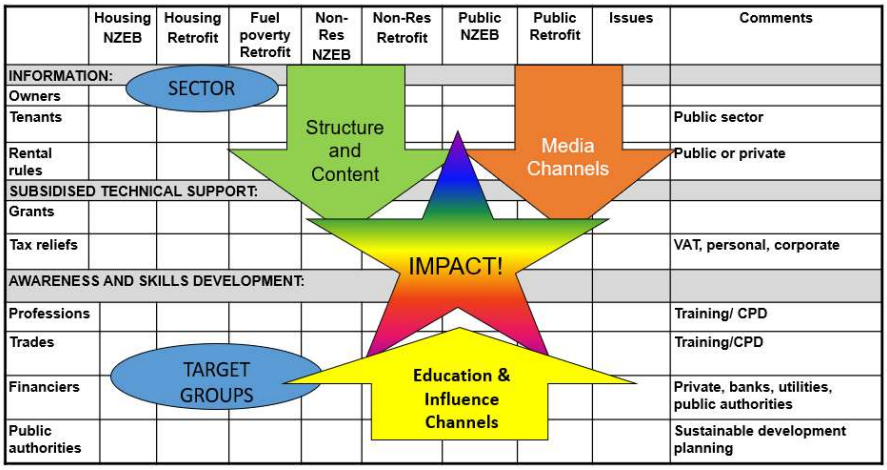
3.2 Profiling information instruments

Figure 3-2 is an overview matrix of the arena for deployment of differing types of informational and promotional instrument available for application in the different building sectors. Types of instrument can be categorised as:

Information and awareness: including not only guidance on the attractiveness of more energy efficient buildings or components, but also promotional information in relation to incentives available, and technical expertise. This awareness raising can also include promotion of energy performance certificate labels and their significance.

Information to assist training and upskilling of construction professionals and trades, as well as financiers and personnel in public authorities.

Figure 3-2 Overview of main groupings of informational instrument



4 MOBILISING FINANCE FOR ENERGY EFFICIENT BUILDING

4.1 Key issues in mobilising large scale investment

Deploying financial instruments to drive energy efficiency improvements on the scale required by EU policies is a complex field. Some of the terms and language that may determine the 'business case' for investments in energy efficiency of buildings by loan financiers for example are indicated in Figure 4-1. A core issue is the perception and mitigation of risk, or conversely the capacity of a project proposal to secure investor confidence. 'Technical assistance' – which typically includes technical, economic and legal/ contractual guidance or other assistance – is often a key resource to gain such confidence. The topics in Figure 4-1 are addressed specifically in Section 5.1.

Figure 4-1 Key issues in mobilising large scale investment in energy efficient buildings

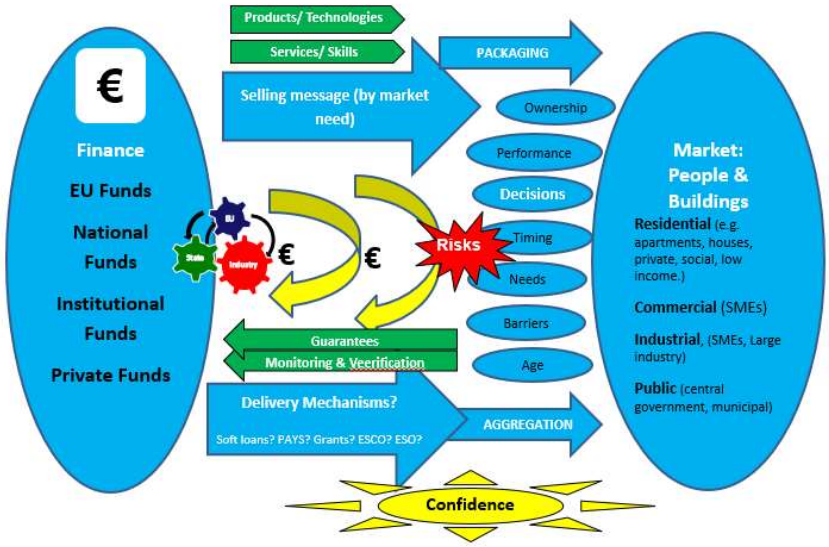
4.2 Bringing finance from sources to people & buildings

Essentially, the challenge presented by finance as a supporting measure for building energy efficiency renovation (and possibly for low energy new builds) can be summarised as follows, represented in Figure 4-2.

On the **demand** side there is a need to understand and engage with a market comprised of owners/ investors and users of buildings. This market of existing buildings comprises many diverse segments with different patterns of building use and energy consumption. These segments require upgrading and an associated technical capacity in order for them to be made more energy efficient. To meet this requirement effective finance is one of a number of supporting measures needed to stimulate action by those who make the key investment decisions and needs to be coordinated with accompanying measures to tackle perceived risks of various kinds and build confidence in the market.

On the **supply** side there are various originating finance sources, including public finances, EU central structural funds and institutional and private finance. These need to be (and are) of sufficient scale and form to initially excite and accelerate the market, build a critical mass and to create a momentum that can be sustained into the long term. To maximise leverage and effectiveness they may be combined and geared in many ways. They hold the potential to meet the finance needs primarily for direct implementation of the required building upgrading investments.

Figure 4-2 Transmitting finance from sources to energy efficient building measures



The essence of the finance challenge is to draw out the financial resources potentially available on the supply side and **deliver** them to the market through intelligent mechanisms so that they are leveraged and applied to stimulate and mobilise energy efficiency renovation at the right scale, pace and depth, sustained from short to long term, to enable Member States to meet their overall energy efficiency targets to 2020 and beyond.

4.3 Sources of funds

Sources of 'wholesale' finance for energy efficiency are available in EU Member States from central EU funds, from national funds, institutional funds and private funds – many of which can be combined to deliver support programmes in the sector.

The large-scale commitment of EU level financial sources cited in the EPBD, and particularly the expansion in 'Cohesion Funds', can play a vital role (Cohesion Funds are directed in general at improving social and economic cohesion and competitiveness across the EU, so lesser developed regions receive priority treatment). Among examples of several other sources of EU funding in recent years (all with particular target sectors) have been:

- European Regional Development Fund: including for energy efficiency investment in housing
- Public Private Partnerships on a 'European energy-efficient buildings' initiative.

- EIB investment support through 'EU sustainable energy financing initiative', with over €5 billion per annum in buildings renovation
- EIB-led 'Marguerite Fund': 2020 EU Fund for Energy, Climate Change & Infrastructure
- Directive 2009/47/EC amending Directive 2006/112/EC regarding potential for permitting reduced VAT rates on energy efficient products
- Structural and Cohesion funds instrument Jeremie (for micro to medium enterprises)
- EU Energy Efficiency Finance Facility
- Research, Competitiveness and Innovation programmes focused on removing market barriers related to EE and RE through for example:
  - Intelligent Energy Europe €735M
  - Technical assistance facility ELENA €97M
  - Covenant of Mayors
  - Entrepreneurship and Innovation programme
  - ICT Policy Support Programme 2010, and FP7
- Research, Technological Development and Innovation programmes, notably the current 'Horizon 2020' programme which supports a wide range of energy research, development and demonstration projects tackling the barriers, improving the competitiveness of new technologies.
- European Bank for Reconstruction and Development funding for energy efficiency measures in eligible Member States and regions.

National funds in EU Member States are generally applied in the form of grant administration schemes, tax relief schemes and energy efficiency funds used to provide or underwrite low interest loan facilities for qualifying energy efficiency projects.

4.4 Leveraging of funds

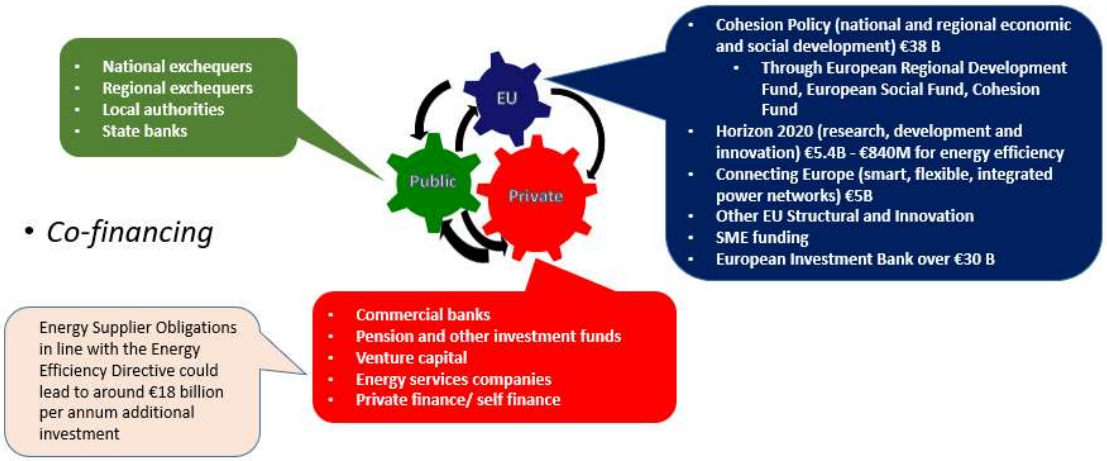
The conditions of co-funding can be seen as presenting a considerable opportunity to leverage national, regional, institutional and private sources and amplify the overall impact of national instruments. This is illustrated in Figure 4-3, showing a potential to mobilise investment in excess of €100 billion. But it is important to note that, as a pre-condition for using EU Cohesion Funds for building rehabilitation, certain articles of the EPBD must be correctly transposed by Member States.

Regarding the scale of central EU funds, terms of support, sectors and regions of application and experience and impact of applying these funds on the basis of evidence and case examples, there has been a growing appetite for leveraging such funding in many Member States. Close liaison between the Ministries responsible for energy/economy and structural funds (usually for enterprise, finance or similar) is necessary to avail of this opportunity at MS level.

Experience has shown that has been necessary for financial instruments to be customised to regional/ local socio-economic, legal and banking conditions. Frequently, these include the establishment of new legal and administrative mechanisms to administer and leverage the flow of funds from the various co-funding entities, which can involve revolving funds. Typically, these consortium members have included some combination of EU funding bodies, regional

governments, energy agencies, municipalities, State banks, merchant banks, local retail banks, energy companies, installers, housing agencies and associations, home owners, Energy Services Companies (ESCOs) and project consultants.

Figure 4-3 Schematic of leveraging EU funds to combine with national and private funds



At least 14 Member States have used EU or European Investment Bank (EIB) funds to co-finance energy efficiency programmes or schemes in building construction or renovation, in housing or non-residential buildings, principally through preferential loans, grants, and associated 'technical assistance' (TA) (e.g for training, marketing and procurement set-up) to public authorities, building owners or ESCOs. Despite difficulties caused in some MS by banking and public finance crises, these initiatives have achieved good results and most are working well. The most common format for success is preferential loans, possibly complemented with a grant and/or TA package. Grants act as a catalyst, but ultimately there needs to be a sustainable market dynamic for energy efficiency, e.g., revolving loans and ESCOs, and there is a gradual move in that direction. The Estonian KredEx model highlights how funds can be successfully leveraged. The European Investment Bank (EIB) is an important source of leverage for at least 11 Member States, part funding at up to 50-75%, mainly in public and social sector building renovation. An example is the renovation of 270 buildings with 23,000 apartments in Bucharest achieving 50% average energy savings through an investment of 140 M€, for which EIB provided a 50% loan.

4.5 Delivery mechanisms

'Wholesale' finance can be applied to the delivery of programmes, partnerships and schemes at market facing level (including 'retail finance'). This is most commonly delivered through retail banks, local authorities, public institutions which are in a position to administer funds at a relatively small scale (say below €50,000 per project) whereas 'wholesale' finance is normally at a scale of €20 million or more.

In the case of EU Commission funds, this can involve formal partnership agreements with 'Managing authorities' (Ministries or agencies) in Member States. At individual operational programmes, Member State bodies alone select and implement projects/ programmes/

schemes. EU funds are always matched by public/ private funding within Member States. Such co-financing rates are normally in excess of 50%, so the funds leverage ratio is at 2:1 or more.

Regarding the benefit of such funds deployment, analysis of Member State experiences has indicated that national schemes show typical benefit to cost ratios of 5:1.

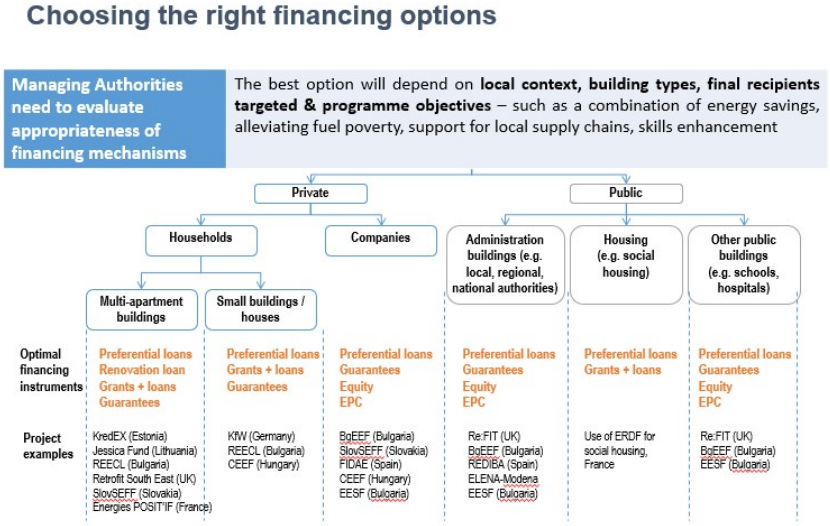
Grants/ subsidies administration (traditional) are still applicable, e.g. to support deep renovation beyond regulatory requirements, demonstration projects, develop innovative technologies, tackle 'energy poverty' and support business investments in energy efficiency (subject to being within EU competition rules).

4.6 Guidance on developing financing schemes

As cited above, there is a strong encouragement and commitment to deploying new financial instruments in order to catalyse upscaled investment in energy efficiency upgrading of buildings.

A report for the EU Commission ICF report on 'Financing the Energy Renovation of Buildings with Cohesion Policy Funding' (https://ec.europa.eu/energy/sites/ener/files/documents/2014_guidance_energy_renovation_buildings.pdf) contains very useful guidance for EU Member State authorities on how to approach the effective planning and deployment of EU funds to sustainable energy investments in buildings in their jurisdictions. It provides a range of funding models combining different funding sources delivered through a wide variety of 'retail' delivery mechanisms – typically through banks, local authorities and special purpose programmes. It presents a variety of good practice approaches, aimed at attracting greater levels of private sector investment, attuned to the needs of different building sectors, together with a number of illustrated case studies. An example of its guidance on choosing appropriate financing models is given in Figure 4-.4.

Figure 4-4 Example of guidance on establishing appropriate funding schemes

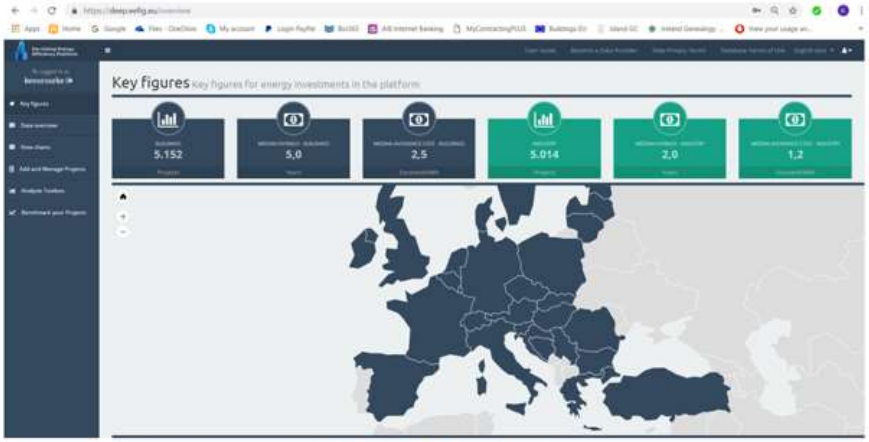


4.7 Confidence building – the DEEP platform

The Energy Efficiency Financial Institutions Group (EEFIG), consisting of 120 experts drawn from around 50 EU financial institutions and energy efficiency professionals, was engaged by the EU Commission to address the challenge of mobilising investment in energy efficiency upgrading of buildings. Its deliberations have contributed to the establishment of the EU 'Smart Finance for Smart Buildings' initiatives, focussed on de-risking investment in energy renovation of buildings.

An example of a resource developed to assist the development of confidence is the 'De-risking Energy Efficiency Platform' (DEEP) (Figure 4-5) which is a database including over 600 case examples of energy efficiency projects covering the full spectrum of scale and payback.

Figure 4-5 The DEEP platform



https://deep.eefig.eu

4.8 Confidence building – the IPMVP

A key policy priority is the mobilisation of investment in energy upgrading of the existing building stock. Importantly, the perspective of investors and bank lending institutions on energy efficiency investments in buildings involves a need for 'standardised' methodologies for pre project evaluation, and for monitoring, verification and reporting post project, in order to maximise confidence (minimise risk) in the fundamental business case and minimise the administrative burden. However, the scope of the EPC in its present form is not considered sufficient as an 'investment grade' energy audit. However, a positive development is the emergence of a number of standardised, versatile international protocols to assist the ex-ante and ex-post evaluation of energy savings, for example the International Protocol for Measurement & Verification (M&V) of Performance (IPMVP, www.evo-world.org) and the Investor Confidence Project (ICP, www.eeperformance.org). Volume III of the IPMVP provides addresses methods associated with new building construction, and with renewable energy systems added to existing facilities. These constitute an integrated set of standards, practices and documentation in order to create the data necessary to enable underwriting (guarantee) or managing of energy performance risk. Such a monitoring and verification system needs to

be incorporated into a scheme or programme from concept stage (e.g. through EPC registries) to verify effectiveness and value for money.

5 SPECIFIC CHALLENGES AND OPPORTUNITIES

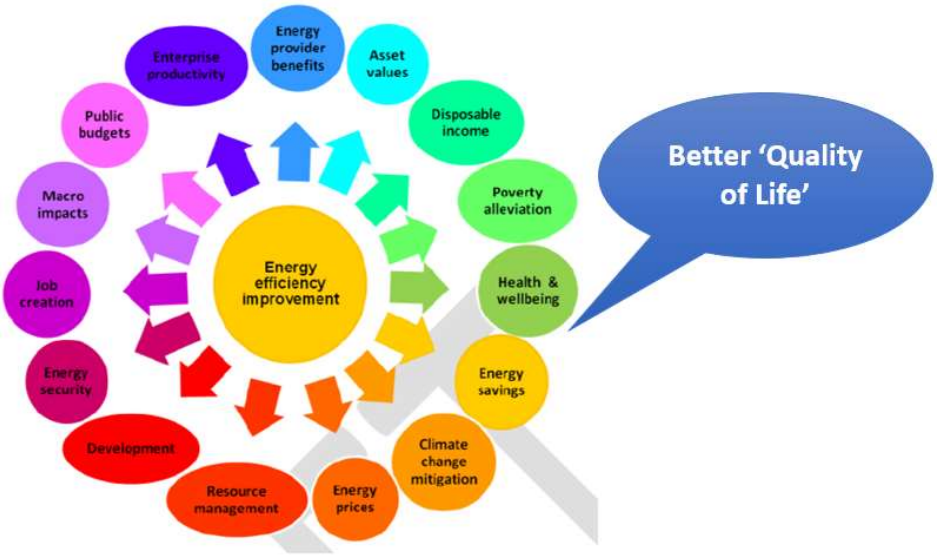
In seeking the most effective deployment of investment finance from funding sources and making the 'business case', there are a number of specific consideration and mechanisms that present important challenges and opportunities, now outlined.

5.1 Co-benefits of energy efficiency

The business case for energy efficiency investment, for both national authorities and financial institutions, should not be restricted to looking at the energy and cost savings achieved, but should consider including benefits from improving the quality of the building stock as a capital asset, related quality of living and working, reduced CO_2 emissions, reduced maintenance costs, improved productivity, etc. Such benefits may exceed the energy cost saving benefits alone, so that energy efficiency may be a secondary motive from the differing perspectives from different stakeholders. For building owners, it may be an overall upgrading of building quality and value, and for governments it may be employment content. Thus, there is a need for information to be configured in a versatile way for different decision makers.

An illustration of the multiple benefits of energy efficiency (as per the International Energy Agency) is given in Figure 5.1.

Figure 5-1 Co-benefits of energy efficiency projects and policies



5.2 Engaging, partnering and working with financiers

A key weakness in the expert technical community (whether employed in the market or by public authorities) seeking to promote investment in building energy efficiency projects and programmes is an inability to understand the perspectives, language, processes, rules and other

needs of decision makers and investors in the banking/ financing sector (and indeed in engaging with Ministries of finance). The success of the energy efficiency mission depends vitally on the ability of this technical community to 'speak the language' and understand the processes necessary to gain the confidence and commitment of the financial community – i.e. to succeed in securing the necessary levels of investment finance from that community.

In seeking funding for a programme, scheme or project, the fundamental need is to present a professional and successful 'business case'. From the bank's perspective, the emphasis is often less on the reward to risk relationship than it is on the need to identify, explain and satisfactorily mitigate all sources of perceived risk. Short payback proposals do not necessarily receive finance and long payback proposals did not necessarily fail, as other motivating factors may be more important than energy savings. Often more important than the predicted savings or return on investment is the strength of the project team – which may only be considered to be as strong as the credit risk rating of its weakest member. Thus, the status of the people can be more important than the projected return on the project. This can be a barrier for SME partners in projects, which may have difficulty convincing banks of their viability beyond, say, a 5-year time horizon.

The predicted energy savings and the technical methodology used to compute these savings is of course significant. In this regard, banks often like to rely on 'technical assistance' in the form of independent expertise on which they can draw to evaluate the technical energy performance risks. This may entail an 'investment grade' energy audit, in the case of building renovation proposals. To be secure regarding the cash flow and 'bankability' of a project, a bank may also wish to obtain some form of energy performance guarantees (which might be accompanied by a monitoring and verification protocol). Likewise, the use of products or systems that are accredited by independent authorities (for example, with performance listed on a public register) is a source of confidence. It is noteworthy that in general across Member States, the information in energy performance certificates regarding cost effective improvement options is not considered is not 'investment grade' data; that is, it would not provide a sufficiently clear and reliable basis for committing investment. Such information would still need to be supplemented with other information relevant to banks. Protocols such as the IPMVP and data such as the DEEP platform, both outlined above, can assist this confidence building.

Banks tend to prefer simplicity over complexity as the latter is perceived as risk, so significant effort may need to be applied by proposal teams in making the complex simple. In particular, banks employ standardised documentation and administrative procedures and it is wise to minimise deviations from such systems. To minimise transaction costs, projects of larger scale may be more attractive to a bank than small scale projects – provided this avoids undue complexity and risk. In some instances, bundling or aggregation of projects may be appropriate, in which case intermediaries may be required to co-ordinate and synthesise the overall project. This might apply, for example, to projects being assembled by an ESCO or an energy utility (e.g. under EED Energy Supplier Obligations). A potential benefit with aggregation is to reduce risks of an individual project failing to deliver, and a loan could be based on a pre-set failure rate that is considered realistic and tolerable.

In almost all Member States, national authorities and agencies responsible for energy efficiency in buildings have been active in engaging with banks, and in understanding and resolving these issues. This has been happening in the process of seeking to establish specific energy efficiency

funds, including jointly developing special purpose fund administration mechanisms, and risk sharing or mitigation measures.

5.3 Role of ESCOs & Energy Performance Contracting

Development and promotion of Energy Services Companies (ESCOs) and associated energy performance contracting (shared savings model) has a potential to stimulate significant activity in improving the energy efficiency of commercial and public buildings in particular.

ESCO markets in Europe are at diverse stages of development, so Member States have been learning from each other in supporting these markets. Some countries have many ESCOs (e.g., over 500 in Germany, over 300 in France, 80 in Italy) but most have typically less than 20 ESCOs established (14 countries each have 10 or less), complemented by engineering consultancies and technology providers offering solutions with elements such as equipment leasing and performance guarantees. Steady growth has taken place in Denmark, Sweden and Romania and to a lesser extent in Spain, Italy, France and Ireland[2]. Market growth is being driven by regulatory frameworks, financial incentives and increasing awareness. The inclusion of an energy (cost) saving guarantee in the offer is considered particularly important.

Among the indicators and facilitators of success are: the availability of model contracts, standards and/or intensive information dissemination carried out by third parties/market facilitators or intermediaries; engagement of a wide array of companies, including energy supply utilities, consultants, etc., indicating an open and competitive market; and the establishment of ESCO associations. Many governments offer tax reduction and/or some form of funding to support the energy services market, most have legislation to promote the market, but one third of MS have no financial support.

The motivation for energy supply utility involvement may not be primarily extra direct profit from their ESCO projects directly (although that can be the case), and they are often driven more by regulations on Energy Efficiency Obligations (EEOs – see further below) or Demand Side Management (DSM) programmes (e.g. Denmark, Latvia, Slovenia), and/or they offer energy services to attract new customers and increase loyalty of current ones. The perceived complexity of the business model, including Energy Performance Contracting and the associated procurement and verification processes, is a deterrent to many potential clients and financiers, which highlights the value of model contracts and facilitators who can offer specialised knowledge in technology, financing, management and communication. A small number of Member State authorities have developed model contracts, and specialist facilitation is being provided by national (or local) energy efficiency agencies, private energy audit companies, procurement advisors and some legal advisors.

Because of the transaction costs, larger scale projects are preferred, which are mainly in the public and commercial sectors. Gaining the awareness and confidence of banks is also a challenge. While, in principle, availability of finance might not be a constraint, a significant

[2] Energy Service Companies Market in Europe - Status Report 2013 JRC Scientific and Technical Reports: http://publications.jrc.ec.europa.eu/repository/handle/JRC89550

difficulty can exist in relation to the credit risk status of the client company or of particular suppliers, particularly for contracts extending beyond 5 years.

Public bodies have been expected to take a lead in using the ESCO model. While this market is perceived to be relatively well developed in public administration buildings, hospitals and schools in a few countries, it can still face significant challenges with national exchequer or treasury accounting rules and procurement rules. In the commercial sector, the ESCO market is most developed in buildings such as hotels and large retail premises. Barriers to uptake in office buildings have included the split incentive problem and a mismatch between the long-term nature of an ESCO project and the volatile nature of companies that own office buildings.

It is perceived that to date, ESCOs and Energy Performance Contracts have been applied mainly to improving the energy efficiency of technical systems such as lighting and HVAC systems, and in energy supply solutions such as CHP, with relatively short payback periods compared with building envelope investments, and thus have not been applied to very deep renovation. The main intervention by MS authorities has been to use national or EU funds to support preferential loans (lower interest rates) for ESCO projects.

For ESCOs to grow successfully as a major force for energy efficient investments in building, independently recognised monitoring and evaluation systems (assisted by protocols such as the IPMVP) are crucial.

Financial support for ESCOs comes mostly from central government, with almost half of Member States offering tax reduction and/or some form of funding to support the energy services market. Most also have legislation to promote the market, but one third have no financial support. Apart from central government, local government is an important sources of support in 11 Member States.

Many EU Member States are still developing model contracts, opening credit lines, working with public banks and preparing calls for tender to enable competitive private investment in Energy Service COmpany (ESCO) services to be applied in the public sector. MS need to continue developing model contracts, guarantee mechanisms, opening credit lines, working with public banks and inviting tenders to apply competitive private investment in ESCO services in public sector buildings. Legal changes in procurement and accounting rules are helping to address a previous barrier affecting public sector bodies.

5.4 Energy Supplier Obligation schemes (EEOs)

Another significant requirement for EU Member States is the establishment and operation of EEO schemes or alternative measures that achieve the same amount of energy savings. This has a potential to support significant activity in improving the energy efficiency of buildings. EEO schemes have varied across Member States, in scope, design features and institutional arrangements at national level. In six countries (Denmark, France, Ireland, Italy, Poland and UK), they have transitioned from a voluntary status to a legislated status. In most cases the obligated parties are the financing source of the measures, and the costs are passed to the general population of final customers via the energy price or tariff.

Schemes currently are in place in at least 15 Member States. The main focus of existing schemes in relation to buildings has been on retrofitting of heating/ HVAC and lighting, with few applications to new buildings, innovative technologies or behaviour change. They target low-cost 'shallow' renovation measures for a number of reasons: these are usually the most economically attractive and can be technically standardised more easily than high-cost / complex measures; this enables a streamlined monitoring and verification regime often using 'deemed' savings benchmarks based on representative samples; and this approach keeps administrative cost low (less than 0.1% of total cost in the UK).

In their design and evolution of EEO schemes, Member States need to look beyond shallow retrofit actions and set up systems to encourage deeper renovation measures. One initiative reported from two of the active MS which can help towards this goal is to assign higher credit weightings for 'deeper' and more durable measures.

As with ESCO initiatives, the operation of suitable systems for monitoring and verification of savings is crucial, and protocols and guidance have been made available to assist this process.

6 DEPLOYMENT OF FINANCIAL INSTRUMENTS IN EU

6.1 Profile of deployment

Each EU Member State has typically more than one type of incentivising financial instrument. Many have chosen to deploy a combination of different economic instruments, each tailored to address different barriers, specific segments and recipient groups within the building sector. As shown in Figures 6-1 and 6-2, subsidies/grants, EU funding and soft loans are the most common current (and likely future) types of financial instruments, followed by tax reliefs, guarantees etc. Germany, Estonia and Lithuania provide incentives for renovating apartment buildings related to certified energy performance. Figure 6-2 indicates Member State views on the perceived relative future importance of different types of instrument, which does not show a fundamental change and probably arose from their limited experience to date in deploying new types of instrument.

Figure 6-1 Numbers of Member States deploying different types of financial instrument

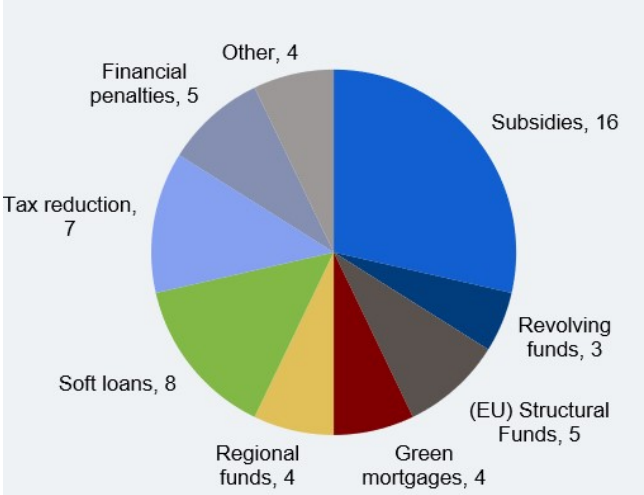


Figure 6-2 Member States & their perceived future importance of financial instrument

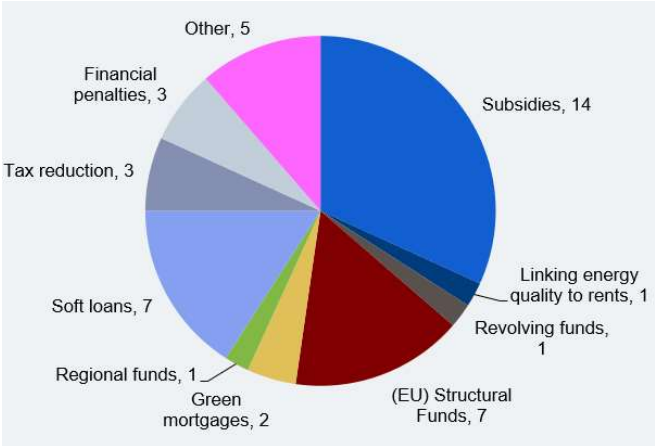
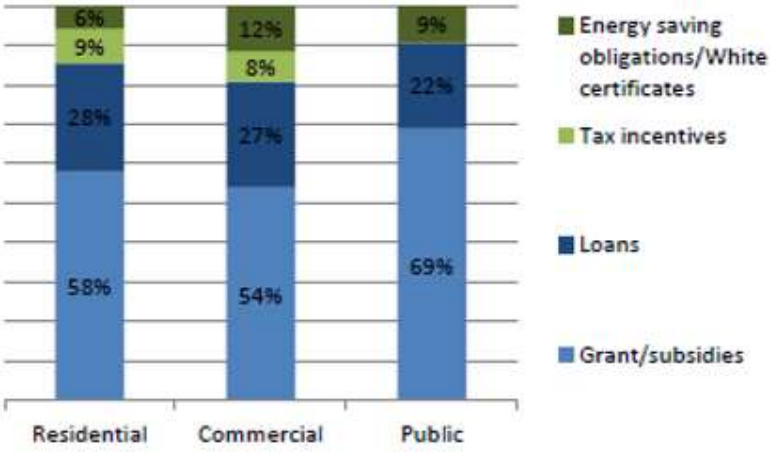


Figure 6-3 shows that grants and soft loans are the leading financial instruments for residential and commercial buildings, whereas for public buildings ESCOs/third party finance initiatives are leading, closely followed by grants/subsidies.

Figure 6-3 Proportionate deployment of financing mechanisms by building sector

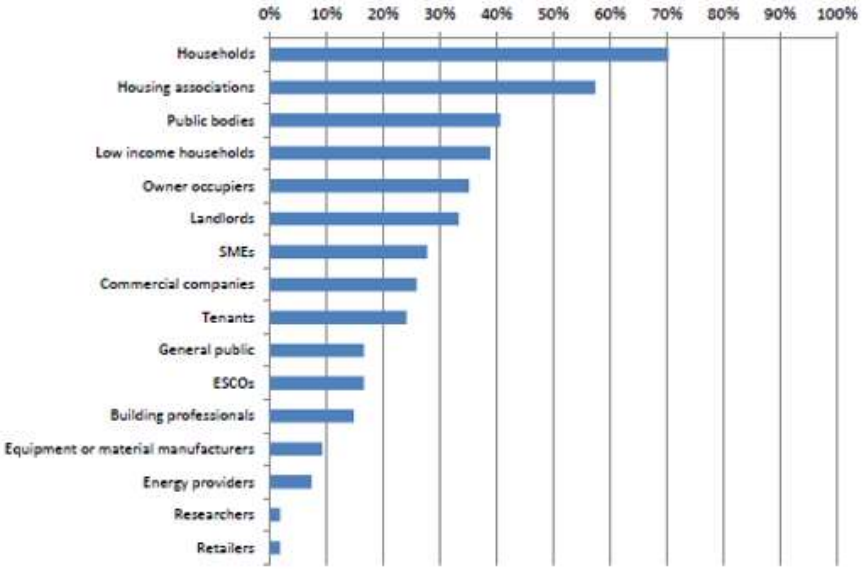


However, for all sectors there is a recognised need to migrate from capital grant based supports to more sustainable market based alternatives, triggering higher levels of activity and reach through mobilising private capital co-funding. This is highlighted further below.

6.1.1 Application of financial instruments

A large range of groups are targeted by current instruments (Figure 6-4), reflecting the long complex chain of actors involved in the building sector. These 16 groups ranged from households, housing associations to public authorities, commercial companies, ESCOs and many others. Tenants also formed part of the target group in certain programmes.

Figure 6-4 Groups targeted by economic instruments (shown as % applied to each group)



The intervention measures supported by these economic instruments concerned all building elements and intervention types. The most common measures included upgrade of HVAC systems, installation of insulation and replacements of windows, other building envelope upgrades, renewable energy generation - thermal and electric, and district heating or cooling. In a proportion of cases, energy efficiency measures are combined with non-energy related interventions such as general maintenance work, HVAC works and structural construction repairs, which improves the economic case as in those circumstances the marginal costs assigned to the energy efficiency measures are reduced.

Grants and subsidies were used to reduce initial costs for material, equipment, installation, advice and certification. Public funds were also used to buy down interest rates and make loan financing for energy efficiency investments more attractive. Corporate and income tax credits and deductions for the acquisition of energy efficient products are also available in certain cases. For example, in Ireland a register of over 10,000 certified energy efficiency cohorts of products in 50 technology categories is eligible for accounting treatment that entails tax relief for businesses paying company tax (https://www.seai.ie/energy-ratings/triple-e-register-for-business/). As previously outlined, energy efficiency obligations (EEOs) and white certificates – placing mandatory energy targets on energy supply utilities are important in certain Member States.

6.2 Incentivising performance exceeding building energy codes

In some EU countries, it had been indicated that the financial costs associated with energy performance measures hinder compliance, even with mandatory requirements. Financial incentives can be a good initial driving force for improving the quality of works, gaining confidence and accelerating earlier compliance with energy performance requirements (provided they do not contravene EU 'State Aid' rules on fair competition). In Member States, this type of support may take the form of direct grants, favourable loans, tax credits and relief, ESCO financing, white certificates or metering tariffs.

Financial incentives may also be key to incentivising buildings going beyond the requirements. For example, Belgium (Wallonia), Cyprus, Germany, Slovenia and others established grants for buildings that exceeded the EP requirements. Subsidy schemes in Austria and Germany operate in a way that rewards higher energy performance of new build or refurbishment with higher funding levels or more favourable loan terms. In several EU countries, financial incentive programmes, mainly for energy renovation, also include EPCs as a precondition.

6.3 Case examples of effective financial instruments

A number of EU Member States have operated financing schemes in which the level of subsidy (as a percentage of eligible costs) and/or the level of low interest loan is graduated according

to the energy performance standard achieved in the new building – whether a newbuild or renovation project.

The German State Development Loan Bank, Kfw Bankengruppe, runs an energy and CO2 building refurbishment programme as part of the German climate protection programme and the Federal Government's programme for growth and employment. The programme offers low-rate long term loans for home improvements if owners invest in energy efficiency while the general improvements are made. The interest rate is reduced using Federal Government funding for the first 10 years of the loan. There is also additional support in the form of repayment or capital subsidies. The loans are given to retrofits of existing buildings and to new-build properties that go beyond the current regulations in terms of efficiency. Incentives of greater capital subsidy or additional credit are given depending on the level of efficiency achieved in the building. The scheme has been able to leverage investment worth between two and three times the federal funding used. It has financed over 10 million housing units (many in multi-family dwellings) to high energy efficiency standards.

Figure 6-5 The KfW financing scheme in Germany

In Estonia, the Kredex scheme supports building envelope, H&V upgrades and renewable energy installations in the housing sector. When the commercial lending rate was 7-10% the scheme was providing loans at 4.3-4.8% interest rates and grant intensity is graduated between 25% and 40% depending on the resultant energy label. It engages a combination of EU and national co-funding, and provides a positive net cash flow to the State (due to trade and labour activity and tax revenues). In Lithuania, again central EU funds along with national financing, three levels of subsidy rates (15,30,50%) apply depending on energy performance achieved. Similarly in Austria, the subsidy rate increases with the ambition grade of construction improvements. Also in Austria, a Green Building Cluster supports the development of innovation project ideas, assisting proposers to identify project partners, develop project proposals, implement projects and disseminate results.

In France, Energies POSIT'IF is a public-private company that helps to plan, structure and fund the supply of deep renovation in residential and public buildings. In the residential sector, it complements the initial support provided to condominiums by local energy agencies and provides technical coordination of work with an energy efficiency commitment and a financing offer. In public buildings, it provides consultancy to support local authorities in the negotiation process for energy performance contracts with private operators, with terms of between 15

and 30 years. Energies POSIT'IF mainly negotiates the contracts and develops the financial engineering, while all technical aspects are subcontracted.

Such initiatives highlight how central funds can be successfully leveraged and deployed.

7 INFORMATION CAMPAIGNS

7.1 Promotional, information & awareness campaigns

All Member States have experience in delivering information campaigns on energy efficiency in buildings. This has included information support to inform and complement investment action in energy efficient buildings, linked to building energy certification and establishing and promoting registers of product and service providers.

Informational/ promotional tools aimed at strengthening awareness, highlighting the benefits and gaining confidence in the business case for energy efficient buildings include energy certification/auditing, information campaigns, training and accreditation schemes, the exemplary role of the public sector, smart metering/ building monitoring, all of which can be complementary to the role of financial instruments. The majority of EU Member States have applied such tools and engaged in such campaigns. In some cases, campaigns have been delivered via energy supply utilities, especially where the utility is wholly or partly owned or managed by a local municipality/authority.

Moving beyond awareness among building owners to awareness and skills development of building professionals, the establishment and promotion of training and accreditation schemes are an area of significant public/private sector cooperation in several Member States, for example with commercial training providers and/or construction professional bodies. These can be important in enabling establishment of registers of trained/qualified/accreditated architects, engineers, auditors, craftsmen, technicians and installers, as such registers provide an important basis for quality assurance in the newbuild and renovation sectors.

In Ireland a series of workshops / 'road shows' was held on a regional basis to inform interested parties on the progress regarding implementation of the EPBD (particular the mandatory energy performance certificate/ label requirements) and to obtain feedback. A comprehensive promotional and information campaign, including newspaper and journal articles and TV and radio advertising was undertaken in order to inform the industry and the general public, particularly in relation to the new obligations and benefits of energy performance certification (EPC). The campaign included design/print, advertising, press events and indirect marketing initiatives particularly with key market players. Over a four to five year period Irish authorities organised or participated in a total of over 200 information sharing events on various aspects of EPBD implementation, with a combined total attendance of over 25,000 people (Ireland's population is 4.7 million). In order to provide live access to the full community of interests in relation to news, reference material, discussion / consultation documents and other information, a dedicated national EPBD website (www.epbd.ie) was established. A similar campaign was operated by Portugal's national energy agency, offering technical support on its website. In Portugal, the Fund for Energy Efficiency has also provided incentives for dwellings receiving energy performance certificates/ labels to increase their energy efficiency, while in Ireland projects in receipt of grant support are required to have an EPC produced after the energy efficiency upgrading works are completed.

It has been important to sustain promotional activities through repeated multi-channel campaigns of promotion to create and maintain awareness of building energy code and certification/ labelling requirements and benefits to stakeholders and stimulate a market appetite for more energy efficient buildings. Different channels, such as professional events, journals and web services for construction professionals, have applied to different groups. Within those stakeholders, such a campaign can be accompanied by knowledge sharing and guidance initiatives specifically directed at key actors such as designers and specifiers, builders, materials and equipment technicians, site supervisors and building control inspectors. Several such initiatives may be driven from within the industry itself and not require resourcing by the authorities. Again, in Ireland an intensive advertising campaign on multiple media leading to coincide with periods of highest awareness on energy has been delivered annually by the national energy agency over many years.

A further initiative specifically to gain insight and inform the design of campaigns has been its establishment of a Behavioural Economics Unit with a strong focus on the messages aimed at persuading commitment to investment in energy efficiency renovation.

7.2 Packaging solutions – 'one stop shops'

To building owners in general, the issues involved in achieving major improvements in the energy efficiency of their buildings are complex. With reference to the barriers highlighted in Section 2.2, there is a role for public authorities and agencies to assist in establishing local trusted sources of advice in order to gain the confidence of decision makers. In a number of EU countries, notably France, a number of regional 'one stop shops' have been established for this purpose. The concept, integrating and coordinating information, technical, financial and logistical aspects involved in energy performance improvement works to buildings, is illustrated in Figure 7-1.

Figure 7-1 Exciting the market – 'one stop shops'

7.3 The Energy Efficiency Financial Institutions Group

Referenced in Section 4.7 was the work of the EU Energy Efficiency Financial Institutions Group (EEFIG), comprising over 120 expert participants, on 'How to drive finance for energy efficiency investments, Part 1: Buildings', available at https://ec.europa.eu/energy/en/news/new-report-boosting-finance-energy-efficiency-investments-buildings-industry-and-smes. Their report recommended a range of market, economic, financial and institutional actions to help overcome the current challenges to obtaining long-term financing for energy efficiency. These recommended actions were addressed to policy makers and market actors, and included: Articulating the benefits to key decision makers; strengthened processes and standards for EPC/ EP Code enforcement; quality generation and presentation of key data to decision makers; and the role of standardised protocols/ contracts to assist the investment process.

This work laid the basis for further work with the financial challenges related to building renovation across Europe. The report specifically recommended measures for better communication between the financial sector and the projects in need for financing – a topic discussed earlier in this paper. Such measures include the creation of energy and cost databases for buildings and the development of a project rating system to provide a transparent assessment of the technical and financial risks of energy renovation projects for buildings, reflected in the important information resource of the DEEP database, also cited in Section 4.7.

7.4 Market visibility of energy performance certificates

In the best practice cases the introduction of EPCs as mandatory for new construction, sale or rental of a building is playing a prominent role in informing potential buyers and tenants about the energy performance of building units, such as an apartment or office space, or of entire buildings. They are an important resource for informing laypersons in the general public about energy efficiency of buildings. They allow comparisons in terms of their energy efficiency which, with the obligations in relation to their inclusion in property advertisements, is making energy efficiency a visible market factor. This should influence the demand for buildings with better energy performance and using a high proportion of energy from renewable sources. This is expected to increase their market value, on which there is already encouraging research evidence emerging, and to provide a market driver to stimulate building owners to renovate their buildings. Figure 7-2 shows examples of such advertisements.

Figure 7-2 Examples of property advertisements containing an EPC rating

In several countries this has helped to trigger interest among progressive investors in the construction and property sector in going beyond the minimum standards or seeking to undertake energy-saving refurbishment of the existing building stock including. This has been happening in both the commercial and apartment housing sectors.

However, many financing schemes do not link to the EPC in a formal or specific way. When used, its most common role is to verify energy savings on a 'before vs. after' basis. Some interesting applications include a mortgage scheme and provincial subsidy scheme from The Netherlands, a Danish scheme of financing through higher rents, the French PT2+ loan scheme and the Italian tax credit scheme.

8 IMPACT ASSESSMENT ON POLICY INITIATIVES

Well designed systems by Member State authorities for Monitoring and Evaluation (M&E) of financial and promotional policies, programmes and schemes at 'macro' level, and of projects at 'micro' level, are important for ensuring progress to targets, assessing effectiveness and value for money of different schemes and instruments such as EEO schemes, Energy Performance Contracts, subsidy schemes, funds and tax incentives. This can also be important in order to gain the trust and confidence of decision makers: investors, financiers, building owners and energy services companies – and indeed Ministries in relation to introducing market stimulus policies.

The certification and inspection programmes developed in the process of implementing the EPBD have the potential to yield a comprehensive data source on the energy performance quality of buildings. To exploit this potential, central registers of certificates and reports can be equipped with interrogation functions to determine the effectiveness of policy interventions. As examples of such data enabling policy action: In Denmark, it was used to calculate scenarios for potential energy savings in different building types and ages, plus the necessary investments, informing the government's energy saving strategy established in 2012. Similarly, Ireland launched a pilot grant scheme for home energy efficiency upgrades, which then entered full operational mode in the following year. Evaluation was based on 'before and after' Energy Performance Certificate (EPC) data, calibrated with EPC data modelling, assessment of energy bills from a sample of participants, to inform the final design and evaluation system of a full grant scheme which has supported measures in around 25% of the housing stock to date.

At individual project level, a positive development is the emergence of a number of standardised, versatile international protocols to assist the ex-ante and ex-post evaluation of energy savings, for example the International Protocol for Measurement & Verification (M&V) of Performance (IPMVP, www.evo-world.org) described earlier, and the Investor Confidence Project (ICP, www.eeperformance.org).These constitute an integrated set of existing standards, practices, and documentation in order to create the data necessary to enable underwriting (guarantee) or managing of energy performance risk.

9 CONCLUSION

1. Reflecting the seriousness of EU policy intent in this area, extensive attention has been paid to the mobilisation of finance for energy efficient buildings, both to newbuild NZEB in its development phase and especially to deep renovation. The focus of this paper has been on three aspects: sources and scale of finance (particularly at EU level), mechanisms for leverage, and design of instruments for delivery to different sectors. This process entails a flow of funds between 'wholesale' financiers, 'retail' financiers and building owners/ investors.

2. Buildings' authorities in most, if not all European countries continue to need guidance on the key challenge of using finance, from whichever source, into well designed financial instruments suitably customised to particular market segments. An example of a useful guide is '*Technical guidance: Financing the energy renovation of buildings with Cohesion Policy funding*', available on https://ec.europa.eu/energy/sites/ener/files/documents/2014_guidance_energy_renovation_buildings.pdf , which illustrates how many of the funding mechanisms work.

3. To achieve NZEB and deep renovation uptake on a large scale, two particular requirements have been identified as vital: firstly, insight and understanding of the attitudes and motives of building owners and investors, and secondly, the availability of suitable finance. Regarding the motives and decision-making processes of these parties, energy efficiency is not often the main argument and there are different perspectives from different stakeholders. One key to success is that information needs to be configured in a versatile way for different decision makers. For building owners, it may be an overall upgrading of building quality and asset value, improved productivity or comfort, while for governments it may be employment content or health benefits as well as climate policy advancement.

4. Thus, there is a need for information to be configured in a versatile way for different decision makers. For building owners, it may be an overall upgrading of building quality and asset value, improved productivity or comfort, while for governments it may be employment content or health benefits as well as climate policy advancement. It is also clear is that no single "silver bullet" for energy efficiency finance solutions exist due to diverse and complex nature of the sectors.

5. A huge investment opportunity with net gains to Member State authorities and to society in general. Mainly because of employment stimulation and tax revenue effects, energy efficiency support schemes typically yield a net financial gain to the State.

6. There are many case examples across Member States, with different focus and financing models, covering the buildings, public sector buildings and social and private housing. Among the most successful models has been the provision of incentives in the form of grants and/or preferential loans, with the subsidy being graduated according to the level of energy performance achieved, as certified by the resultant energy label. This is possibly complemented with a 'one stop shop' package, administered by a well administered consortium of complementary public and private sector partners.

7. Given the scale of the challenges, there is a policy impetus at EU and Member State level to migrate from traditional forms of subsidy to more market based instruments for lubricating energy efficiency investment activity.

8. Considerations in the design of financial instruments are: the scale of investment to be stimulated; co-financing and leverage; risk sharing; and monitoring and verification protocols.

9. A 'one stop shop' type service integrating and offering a full suite of information and guidance on energy efficiency improvements for buildings may be a very useful mechanism for providing decision makers with the necessary confidence to invest in more energy efficient buildings.

10. National authorities and the professional community of building energy experts need to engage positively in partnership with the financial community, using the frameworks and language of that community. In tandem, the financial community needs to be educated and persuaded on the benefits of investing in energy efficiency, and the energy expert community needs to be educated to adapt to the risk assessment and decision making frameworks of the financial community.

10 REFERENCES

The following are sources of analysis consulted and referenced in the course of preparing this paper. In particular, the EU Commission study carried out by ICF provided significant information and insight into the levels of compliance and associated enforcement profiles across EU Member States.

Also listed is a selection of websites from which useful information can be obtained on EPBD implementation.

Website title and address	Description
Building Performance Institute Europe (BPIE) www.bpie.eu	A European 'think tank' providing policy research and advice on energy in buildings, with publications and monitoring of progress with EPBD implementation, including Finance and Promotions
EPBD Concerted Action www.epbd-ca.eu and report on https://epbd-ca.eu/ca-outcomes/2011-2015	Public website for collaborative forum of Member States to assist EPBD implementation
Build Up www.buildup.eu	EU portal for energy efficiency in buildings. Extensive library of documents, webinars etc. relating to EPBD and related implementation
EU Commission – energy efficiency in buildings https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings	Covering EPBD and allied Directives, independent reports, national reports, events

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