Alternative financing schemes for energy efficiency in buildings

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Abstract
The deep renovation of existing buildings is essential to achieve the European Union’s energy and climate objectives for 2020 and 2050. However, a key obstacle is the lack of financing schemes adapted to the existing building stock, whether public, commercial or residential.

We propose a critical inventory of traditional and alternative financing schemes. Case studies include schemes based on energy performance contracting, such as market facilitation in Berlin and EPC for deep renovation in Latvia and France. Pooling buildings or bundling different building owners is presented as a way to make projects more bankable.

We then analyse third-party investment schemes which disconnect the burden of debt from the building owner and attach it to the building, such as PACE schemes (US) and the Green Deal (UK), used by the City of Newcastle to invest in projects carried out by a private delivery partner. We also present Énergies POSIT’IF, the public ESCO recently created by the Ile-de-France region to invest in the deep renovation of condominiums.

The provision of affordable and sufficient financing for ESCOs can be facilitated through soft loans, loan guarantees, or even portfolio guarantees as provided by BgEEF in Bulgaria. ESCOs can be refinanced through the assignment of their claim on future energy services to specialised vehicles, such as the EESF in Bulgaria, or through securitisation and the emission of bonds at a later stage. EU structural funding, expected to double, could be used to develop financing vehicles adapted to the needs of the different schemes, or to fund the development of a credible project pipeline.

It is possible to develop financing schemes adapted to the large-scale deep renovation of buildings. Their replication, adaptation and up-scaling will require public support in the coming years, in the form of improvements in the legal and policy framework, project development assistance, and capacity building along the whole value chain.

Introduction
The building sector represents 40% of final energy consumption in Europe. Housing represents 75% of the total floor space, with single family houses representing 64% of the European housing stock; the non-residential building stock represents 25% of the total floor space. It is acknowledged by the European Union that a major reduction of energy consumption in the existing building stock is essential to reach the EU targets of 20% energy efficiency by 2020, and the long term objectives of decreasing greenhouse gases emissions by a Factor 4 by 2050.

1. The sole responsibility for the content of this article lies with the authors. It does not necessarily reflect the opinion of the European Commission or ADEME, which are not responsible for any use that may be made of the information contained therein.

2. BPIE 2011.

3. The “Factor 4” has been officially included as a target in a number of national policies (e.g. France, UK, etc.) to refer to a 75% reduction in greenhouse gases emissions by 2050 compared to 1990. The concept originally refers to improving by a “Factor 4” the productivity of resources (Von Weizsäcker, 1997).
Currently, building owners and investors tend to focus on measures with short to medium payback periods (less than 10 years), which usually generate less than 30 % savings. However, ambitious energy and climate policies require saving up to 80 % energy in buildings, which can only be reached through structural interventions: insulation of facades, replacement of windows, in some cases ventilation systems. This is referred to as "deep renovation", and has payback times between 15 and 40 years at current energy prices¹, not in line with the time horizon of most property owners. Moreover, collecting the "low hanging fruits" with short payback times has a lock-in effect, in that it increases even more the payback time for the remaining structural interventions, which can never be reimbursed through the savings.

Deep renovation is not a major technical challenge. The key obstacles are financial, as well as legal and political. Most European citizens live in a local or regional community which has committed to strong climate and energy efficiency goals, in the form of a climate and energy action plan². However, most communities lack the financial solutions to address the large scale renovation of the building stock on their territory. Alternative financing schemes are therefore needed to unlock the potential for deep renovation and increase the yearly renovation rate⁶.

A number of schemes have been developed, or are currently being developed, by public authorities across Europe, to provide adequate financing solutions for energy efficiency. Yet, they often do not target the building sector, or only "partial" energy renovation. A more structured and comprehensive approach is needed to combine the different instruments and adapt them to the national or regional specificities, and to the needs of the different market segments.

The present paper aims to identify the different schemes which can be used to finance the large-scale deep renovation of buildings. The first part analyses the shortcomings of existing financing solutions and instruments which in turn reduces the capacity to attract external financers. On top of traditional public subsidies (necessarily limited), there needs to be other sources of financing, but also of technical expertise to support the development of projects.

**Shortcomings of existing financing solutions**

There is a large literature presenting the obstacles to investments in energy efficiency⁷. Looking more precisely at how public authorities can support deep renovation, we propose to analyse the instruments currently available in regards to their ambition and efficiency. We look at the classical public instruments, then at soft loan schemes, and finally at third-party investment and energy performance contracting.

**SPECIFICITIES OF ENERGY EFFICIENCY PROJECTS**

Energy efficiency projects have a specific economic profile as the return on investment is ensured, in most cases, through energy savings (non-expenses) and not through an increase in revenues (unlike renewable energy projects, which generate a positive cash flow). This largely explains the difficulty for financiers to consider this type of projects: culturally, they are trained to "support the growth" of the project developer, more rarely to take into consideration cost optimisation projects where the technical components play an important role in the feasibility and profitability of the operation.

This "cultural barrier" is often accompanied by a problem of "financial attractiveness": the return on investment of energy efficiency projects is on average longer than in development projects. This usually results in an inadequacy between the cost of external financing (interest rates) and the project's profitability.

Finally, energy efficiency rarely corresponds to the core business of a company or to a top priority for energy consumers. As a result, the equity available for these projects is often minimal, which in turn reduces the capacity to attract external financers.

**LIMITS OF CLASSIC PUBLIC INTERVENTION**

Massive and ambitious energy renovation in the building sector cannot be reached with the sole public subsidies:

- Direct and indirect subsidies are limited resources and not sustainable by nature (they depend on public priorities, budgetary margins, etc. . . .), and in fact better adapted for supporting demonstration projects than massive market uptake programs, which require large and constants investments;
- Public subsidies constitute only a partial answer to the needs of project developers, which range from technical assistance to the financial structuring of the project;
- Considering awarding procedures, subsidies are not always targeted to the projects for which they are most justified and may cause unjustified windfall profits;
- Public subsidies do not solve (or very partially) the issue of financial credibility and solidity of projects promoters in front of financial operators (banks in particular). The leverage effect of public support remains therefore limited and the financial closure of some viable projects remains problematic.

On top of traditional public subsidies (necessarily limited), there needs to be other sources of financing, but also of technical expertise to support the development of projects.

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4. This varies across countries and types of buildings. The payback refers to energy investment costs (without general refurbishment measures), with stable energy prices.
5. E.g. the 4,800 members of the sole Covenant of Mayors represent over 178 million people.
6. This paper focuses on financial aspects, but other obstacles need to be tackled at the same time, such as the engagement of building owners or the training of the work force. Our assumption is that a viable financing scheme is a pre-requisite to tackle the other obstacles: a convinced building owner and a trained work force will not be sufficient to trigger investments in building renovation if the financial scheme is not adapted.
7. This can be found in particular in IEA (2011).
SOFT LOANS SCHEMES: THE EXAMPLE OF KfW

Soft loan schemes are a mechanism whereby public funding decreases the cost of loans, which are usually distributed by private banks. The German public bank KfW has subsidised housing renovation for many years. KfW finances itself at low rates on the capital markets thanks to its AAA rating and the guarantee of the Federal State. KfW receives a subsidy from the government to lower the interest rate at which it lends to the commercial banks, which can thus propose loans to homeowners under market rates.

Interest rates are between 1 and 2 % for 10 to 30 years. A label system called "KfW energy efficient house" has been established with heat consumptions corresponding to 55 up to 115 % of the standard for new buildings, which means that interventions on the envelope are usually needed. The interest rate and duration of the loans are more attractive for projects reaching higher energy efficiency. Loans are also available for individual measures. KfW also gives grants for engineering and construction supervision (50 % of costs, up to €4,000) and for the investment (up to €15,000). Grants are often present in soft loan scheme because they reduce the upfront costs for the building owner.

In 2011, in line with previous years, 133,000 homes have obtained loans (€2.8 bn) and 48,000 have obtained a grant (€51.5 m). This corresponds to a total investment of €3.9 bn, creating or maintaining 52,000 jobs (person years) and creating €1.3 bn additional tax incomes. Projects have included insulation measures in 80 % of the cases, and 100 % for projects reaching a "KfW energy efficient house" label.

Soft loans make the investment more attractive to the building owner, although he still bears the costs and risks. They are a very efficient way to finance energy retrofitting of buildings, especially in the housing sector. However, their impact is naturally limited to building owners who are able to take on additional debt. A large share of building owners cannot or do not want to increase their debt for investments in energy renovation; for those buildings, solutions based on third-party investment may be more adapted.

THIRD-PARTY INVESTMENT AND ENERGY PERFORMANCE CONTRACTING

Third-party financing and third-party investment

Confusion often exists between the terms Third-Party Financing and Third-Party Investment and many actors use both terms indiscriminately. To avoid further misperception in terms, we therefore propose to establish a distinction between:

- “Third-Party Financing”, where a third-party (usually a bank) provides the building owner with debt. The third-party financier has a claim on the owner, who keeps his usual role and takes the risk of not achieving the energy savings. The challenge for the third-party financier is to secure the repayment of the debt.

- “Third-Party Investment”, where the investment on the building is not carried out by the building owner, thus relieving him of the burden of debt. The third-party investor has a claim on the future energy savings, and may take on the risk of not achieving the expected savings.

A typical example of TPI in other sectors is leasing, in which the user of an asset (a car or a building) does not possess it but pays a monthly or yearly fee corresponding to a portion of the capital costs, financial costs and maintenance costs calculated over the lifetime of the asset. At the end of the contract, the user may become owner of the asset, or replace it through a new leasing contract (although this is more frequent for cars than for buildings). The advantage of the system is that the user does not increase its debt, and can thus borrow more to invest in its core business.

The transposition of leasing mechanisms to the energy retrofit of buildings is complicated as the building remains the property of the client, who benefits of reduced energy consumptions. A lease would be difficult to sign given the structural nature of the investments required for deep renovation, which can hardly be removed from the building in case of early termination of the contract.

Energy performance contracting (EPC)

The concept of a service for energy savings has been developed in a slightly different perspective through the energy performance contracting mechanism. An EPC is an integrated contract in which an Energy Service Company (ESCO) designs and implements energy conservation measures, and guarantees the energy savings for the duration of the contract. The energy savings are used to repay the upfront investment costs, after which the contract usually ends. Depending on the individual contract, part of the savings may benefit the building owner directly. Two types of EPCs can be distinguished:

- in the guaranteed savings model, the ESCO guarantees the savings, but the building owner finances the investments, usually because he has access to more favourable financing conditions; the EPC thus facilitates the investment decision and the acquisition of third-party financing.

- the shared savings model is a TPI approach, in which the ESCO finances and guarantees the savings, and recoups most of the cost savings in order to repay the upfront costs.

EPC is identified as the key instrument to finance investments on buildings. However, it is rarely used today to finance investments in deep renovation of buildings. Most EPCs are based on the guaranteed savings model, which does not provide new financing solutions: most energy retrofit projects use a loan taken by the building owner.

Besides, EPC for deep renovation is not currently a business model for the private sector. EPCs have historically developed on short term contracts focusing on measures generating low savings such as energy management and lighting, and to a lesser extent HVAC (Heating, Ventilation and Air-Conditioning) systems. The major players in the EPC sector are companies selling measurement devices and/or lighting equipment; they pre-finance such contracts because the payback is quick and...
they mostly sell their devices, with little technical risk. Deep renovation requires investment on the building envelope with a long payback time, which does not fit with the technical and financial model of historical market players.

Most construction companies do not have a culture of building management; their core business consists merely in building, but very few are involved in maintenance. Their business models are based on short-term cash flows and not long-term debt. However, they are an emerging player in the EPC market for deep renovation, and could become central, because they take the lion’s share in the costs of such EPCs.

Another emerging player on EPC markets could be the utilities, seeking to take profit of and develop their contractual relationship with their clients, including selling them energy savings instead of energy consumption. The US experience with energy savings obligations shows that utilities can be quite effective in delivering energy saving schemes to their clients.10

The EPC market is driven by the public sector, which so far is not pushing for high levels of savings in the EPCs which are tendered. Public contracts are awarded according to public procurement rules. In order to procure an EPC, a traditional call for tenders is not very adapted due to the impossibility for the client to define beforehand the technical solutions, the duration of the contract and the level of savings. Two other solutions exist to procure an EPC:

- In a negotiated procedure, the client preselects one candidate ESCO based on its general skills and/or a potential offer, and negotiates with the ESCO the content of the contract; this solution is quite flexible, but provides less guarantees for the client to obtain best value for money, as the preselected ESCO has no incentive to make the best offer;

- In a competitive dialogue, the client preselects at least 3 candidate ESCOs, and negotiates with them in parallel over a several stages procedure. Competitive dialogue provides better value for money, but entails higher costs for the competing ESCOs which can repel them from competing or force the client to offer a fee for covering part of these costs.

In this framework, the lack of capacity on the client side to define and negotiate a contract is a key obstacle for EPC to be used for deep renovation (“there is no good contract without a good client”). As a matter of fact, both supply and demand sides need to be structured in order to develop the market.

Supporting private EPC markets

Despite the flaws described above, a number of solutions can be implemented to increase the impact of EPC and its use for deep renovation.

MARKET FACILITATION FOR EPCS

In order to structure the demand for EPC in the public sector, the existence of market facilitators acting as mediators between ESCOs and their clients has proved to be a successful approach.

As an example, in 1996, the Berlin Energy Agency (BEA) was mandated by the Land of Berlin to develop a viable contractual model, involving private funding, in order to ensure the energy upgrade of public buildings. The “energy savings partnership” program consists in providing technical assistance to local public building owners and launching tenders for the signature of EPCs. BEA manages the entire project until the signature of EPC (project development costs being covered at 50 % by the Land of Berlin).

Buildings are most often gathered in pools ranging from 4 up to 400 buildings, depending on the construction type and on the level of expected energy savings. On average, a pool includes 20 buildings with energy costs of €1.8 m per year, a sufficient potential to attract ESCOs. A contract typically lasts 8 to 12 years, with an average of guaranteed energy savings after refurbishment of about 26 % of the energy consumption baseline, with energy savings of 35 % for the most comprehensive interventions.11 Given the duration of contracts, the measures generally do not include the replacement of windows or wall insulation and focused so far on heating systems and user awareness. The ESCO finance the investments upfront, usually with a bank loan. After the works have been implemented, the ESCO usually transfers the claims on the future receivables (energy savings) to the bank in order to remove the debt from its balance sheet; this is called forfeiting.

The “Energy Savings Partnership” has been one of the catalysts of the EPC market in Germany. BEA has developed a contract model which has allowed other German municipalities to replicate the experience. The success of BEA has raised the interest of the private sector, to the point that BEA is now facing competition on its core activity of supporting public clients in the EPC signature process.

The success of the Berlin experience is the result of a mix of conditions, but more importantly, the result of local political support. The large number of municipal projects has a strong demonstration and multiplier effect on other sectors, particularly the commercial sector. The existence of market facilitators such as the BEA has been reported as an essential element for the development of energy services markets and the principle was adopted in the new European Directive on Energy Efficiency in 2012.12 The replication of BEA’s best practices in market facilitation is starting in several capital cities across the EU.13

AGGREGATING EPCS

EPCs have relatively high transaction costs, especially when they address the building envelope and when they are procured through public procurement rules. It is more complex to define an EPC on deep renovation than on street lighting or HVAC systems. In many cases, there is little or no information regarding the exact composition and detailed plans of the walls. Furthermore, energy savings measures are often combined with general refurbishment measures (such as painting, remodelling spaces or renovating kitchens and bathrooms) which do not generate energy savings but are required by the building owner. Indeed, energy is never the only goal in a comprehensive refurbishment project. An EPC for deep renovation therefore requires more preliminary diagnoses, and adds complexity in the definition of the exact measures

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10. See Palmer et alii (2012).
13. IEE project EES2020, started in 2013.
to be carried out by the ESCO. As a result, the level of detail required to finalise the contract is in most cases higher, which increases the negotiation costs. The novelty of EPC is still another factor increasing transaction costs, because it often requires building owners and ESCOs to invent new working methods and contract models.

This can be overcome by aggregating buildings to increase the size of contracts. Aggregating contracts enables the ESCO to mitigate its risk: a failure on a building may be balanced by better results on the other buildings, so that the overall contractual targets are respected. This reasoning is all the more true when the contract comprises different types of interventions: simple measures such as lighting, operation and maintenance, or the installation of a biomass boiler have only a marginal risk, while comprehensive refurbishment is more complex. In theory, pooling could also be extended to other types of objects such as street lighting.

As a result, an ESCO will be in a better position to finance investments on a pool of buildings than on a single object. It can create a special purpose vehicle (SPV) which will be based on the project’s cash flows; this SPV can attract equity from the ESCO and institutional investors, while borrowing a large part of the investment from banks. Banks will be more inclined to lend to such a contract, because the risk is better mitigated and the legal structure is clearly identified. This type of financial structure can only be implemented above a certain threshold, and may reduce the cost of an EPC by diminishing transaction costs, providing more affordable financing, and reducing the risk margins which the ESCO needs to take.

Two approaches can be found: pooling buildings of the same building owner, or bundling different building owners.

Pooling: the example of PPPs in the Alsace and Centre regions (FR)
BEA in Berlin has pooled EPCs for many years; however, those EPCs have never targeted, so far, investments on the building envelope. In 2009 and 2010, two major PPPs (Public Private Partnerships) have been signed by two French regions for the retrofit of high schools.

In Alsace, 14 high schools will be retrofitted for an investment of €30 m, leading to 35 % energy savings and 65 % greenhouse gases emissions reduction (as a result of the implementation of biomass boilers and PV panels); the contract duration is 20 years, and will be implemented by Ecolya, an SPV composed of Cofely (selected bidder) with additional capital from the public bank Caisse des Dépôts and FIDEPP, a branch of the private bank BPCE. All the operations are sub-contracted by Ecolya to Cofely.

In the Centre region, a similar contract was signed in 2010 with Eiffage for 15 years, leading to €30 m of investments, 40 % energy savings and 50 % greenhouse gases emissions reductions. In both contracts, energy savings only represent 25 % to 40 % of the yearly fees, because both contracts include a lot of non-energetic measures, and also because high schools generally have low energy consumption due to their low rate of yearly occupancy.

Bundling different clients: the example of Huelva (ES)
Not all building owners have a sufficient building stock to be able to pool different buildings. Bundling aims at aggregating different building owners in order to reach a critical mass where municipal projects become bankable for an ESCO acting as a third-party investor.

The province of Huelva in Andalusia comprises a large number of small municipalities. In the IEE-funded project MLEI Accelerate, the Province and the provincial energy agency are working to put together bundles of municipal investment projects which will be tendered to ESCOs. Some bundles target buildings (although the focus is not on deep renovation), and some target street lighting. The Province is currently investigating the best procurement procedures and contractual arrangement in order to make the contract attractive, and to keep the transaction costs as low as possible.

It is complicated for municipalities to sign a contract where they are jointly liable with other municipalities, and they are usually reluctant to do so, although this would be the most attractive for ESCOs. If individual contracts are signed in the end, with different levels of savings and durations, a possibility is to select the ESCO on the basis of a few case studies, and to customise the offer to each municipality after the ESCO has been selected. The EPCs are expected to be signed in 2015. A similar project is taking place on street lighting in the Province of Teramo14 (Italy).

IMPROVING THE LEGAL FRAMEWORK FOR EPC
The uptake of EPC can also be accelerated if a number of legal obstacles are tackled.

Tackling the split incentive in the rental sector
One major barrier impeding investments in energy efficiency in the rental housing sector is known as the split incentive, in which building owners do not invest in energy savings if those only benefit to the tenant. Regulatory improvements have been introduced in the Netherlands with some success, whereas the French compromise introduced in 2009 (50 % of energy savings can be recouped by social housing operators for 15 years, not indexed on inflation) actually represents only a minor part of the overall project costs. A specific status for EPC fees could therefore be created in the recoverable housing charges to enable reasoning in total occupancy cost. Alternatively, “warm rent” is a system where energy costs are included in the rent, thus enabling the building owner to recoup the savings when he invests. Warm rents already exist in countries like Sweden and could be introduced in other countries, possibly first on an experimental basis. Even though recouping energy savings from tenants raises political issues, it is essential in order to create a viable model for the retrofit of the European rental housing stock15, in particular through EPC.

Providing equal access to public support and fiscal incentives
In several EU countries, energy renovations benefit from various public supports: tax exemptions, subsidies, subsidised loans, etc. Value Added Tax (VAT) is often lower for energy saving works, but in an EPC they are submitted to the standard VAT rate as they are considered part of a service; this entails a lower cost and a natural preference for direct financing by building owners compared to third-party investment. Conse-

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14. IEE project MLEI PARIDE.
15. For detailed recommendations, see Milin and Bullier (2011).
Combining EPCs and grants

The initial logic of EPC is that the energy savings enable to repay the initial investment. However, it is clear that in a number of buildings this is not feasible, especially for deep renovation of buildings with average energy consumptions (partially retrofitted buildings, or the most recent part of the building stock). The energy savings generated over the lifetime of the investments will not be sufficient to reimburse all the upfront costs and the financial costs.

Subsidy schemes are usually designed to co-finance a given share (e.g. 30 %) of an investment paid by the recipient. In third-party investment through an EPC, the final beneficiaries are paid by the ESCO (for an amount which is not always transparent) and the recipient cannot provide evidence that he has paid for those investments. Therefore, the public authority cannot evaluate the basis of subsidy and verify it is not paying more than the maximum share of investment. This is notably an issue in regards to the use of the EU structural and cohesion funds for the period 2014–2020.

A solution is to allow the transferability of grants to an ESCO if the building owner is eligible to the grant. This is the case only in Latvia (as far as we know), where a grant can be received by an entity acting on behalf of the final beneficiary. This enables RENESCO to receive EU structural funds targeted to homeowners in order to invest on their home, through an EPC with guaranteed savings of up to 60 % for 20 years.

An alternative solution is to subsidise the ESCO directly, as it is the case in the “2 000 ESE” (2,000 ESCOs) programme in Spain. However, it requires a complex procedure in order to ensure compliance with the European regulations on State aid rules and to avoid market distortion. Moreover, there is a strong reluctance in most countries to subsidise directly private ESCOs, because it is seen as subsidising private profits, although this is the case for construction companies in most subsidy schemes.

Allowing EPCs to be accounted “off balance sheet”

One of the key interests of TPI through an EPC is the possibility for a building owner to improve the energy performance of its asset with limited risk (guaranteed performance) and without increasing its debt ratio. This is particularly important at a time when public authorities are under severe budget constraints which may lead some of them to the mere impossibility to borrow money.

Several countries have recently revised the accounting rules for public-private partnerships (PPPs), in order to prevent the development of long-term financial commitments which are equivalent to a debt. For instance, in a PPP for a school or a hospital, the building will be fully paid by the public authority over the lifetime of the contract, sometimes at a higher cost. As EPCs usually fall under the legal category of PPPs, they are automatically considered as debt and thus integrated in the balance sheet of the public authority. Yet, one could argue that the payments related to an EPC are not exactly debt as they are based on the revenues (energy savings) generated from the contract, as is the case in a PPP for a toll highway, which is not considered as public debt.

There is no common doctrine on this aspect at the European level, but a dialogue between the Finance ministries of the different Member States would be beneficiary to overcome this obstacle. Corporate building owners are faced with similar issues, which could be improved by increasing knowledge on EPCs among financial auditors.

Disconnecting debt from the building owner

Several financing schemes are based on a stronger public intervention than the simple EPC model, although they can rely on it or be combined to it.

Some schemes may be set up at local or national level in order to avoid the building owner to pay the upfront costs, and to collect the repayments through ways which are not attached to the owner, but to the property. This reduces the risk of payment defaults and enables to undertake investments even if the building is sold before the investment is repaid, as the “debt” is transferred to the new owner. In markets with a high turnover rate such as commercial buildings, this is an efficient approach to overcome the stakeholders’ aversion for long-term investments.

PUBLIC FINANCING COLLECTED THROUGH PROPERTY TAXES

In the U.S., Property Assessed Clean Energy (PACE) schemes are based on the provision of financing by the local authority for building owners wishing to save energy and/or install renewable energy in their building. The reimbursement of the investment, which may include interest rates, is done through local taxes, which are attached to the building rather than to the owner. If the building is sold, the “loan” is reimbursed in priority, like local taxes, before any other claim on the building.

9 local or State PACE schemes have been put in place in the US between 2008 and 2011\textsuperscript{16}, and similar schemes exist in Australia. Local authorities usually finance this through the emission of bonds. In the US, PACE schemes have been put on hold recently due to a decision by the Federal Housing Finance Agency requiring that mortgages holders approve PACE loans before they are contracted, arguing that PACE loans are based on collateral (i.e. the value of the home) rather than ability to pay (energy savings).

PACE programmes have been successful in triggering investments in buildings, although usually not in deep renovation. However, the burden of debt remains with the local authority, which is often an issue.

ON-BILL FINANCING AND THE UK’S GREEN DEAL

On-bill financing is a mechanism in which energy suppliers collect the repayment of a loan through energy bills (such loan is often granted by the energy supplier itself to its client). It leverages the relationship which exists between a utility and its customers in order to facilitate access to funding for sustainable energy investments. It has been largely developed in the US since the 1980s, but mainly with a focus on the most profitable energy conservation measures (systems and regulation).

In addition, the proposed interest rates usually ranges between 7 and 15 %\textsuperscript{16}, which reduces dramatically the profitability of

\textsuperscript{16} Palmer (2012)
investments and limits greatly the possibility of more ambitious energy retrofits.

In the UK, the Green Deal mechanism has been launched in January 2013. It can be summarised as “a loan facility attached to the property not the householder, which could last as long as 25 years, that enables efficiency improvements to be funded with no upfront costs and repaid via a charge on energy bills. It also enables the charge to be passed onto the next owner occupier or tenant in the event a householder moves – since liability for loan repayment will sit with the person who pays the energy bill”. The “Golden Rule” provides that loan repayments cannot be higher than energy savings. The Green Deal is based on a standardisation of measures (45 standard measures) and loan contracts, which simplifies the initial assessment and the negotiation process.

In the longer term, this standardisation is essential in order to create a secondary market. Once a sufficient number of Green Deal contracts have been signed and have proved that they generate safe revenue, this should constitute a sufficient track record to consider Green Deal loans as a standard asset with a guaranteed revenue stream which can be bundled, securitised, and sold to investors. The Green Deal mechanisms could allow to move energy retrofit repayments from the high-cost world of consumer finance and to bring them into the lower cost world of asset finance.

However, the constitution of a first pipeline of projects is faced with the difficulty to convince forerunner households (who are therefore offered a grant), all the more as Green Deal loans are expected to be at an interest rate around 7%, above usual mortgage rates. This high interest rate will probably reduce the profitability and discard investments in deep renovation.

In the frame of the Green Deal, several UK local authorities are setting up schemes in which a private delivery partner will be mandated to carry out a large number of Green Deal contracts, with support from the local authority in securing householders commitment. The local authorities also plan to invest directly in the scheme, as they have access to lower interest rates through their prudential borrowing than private Green Deal providers. In the area of Newcastle, €30 m are planned to be invested in up to 5,000 homes by 2015.

A similar scheme is planned in Padova, Italy, aiming to trigger investments of €15 m in private homes in the frame of a pay as you save scheme. Financing will be provided through an equity fund attracting private equity and debt.

Public Third-Party Investment Operators

EPCs and third party investment approaches are generally limited to the simplest operations with relatively short payback period. Market actors need to see concrete viable cases of EPCs for deep renovation, including investments on the building envelope. Banks and institutional investors have requirements which cannot easily be met by deep renovation projects in terms of profitability, liquidity, and trustworthiness (due to the absence of a track record). Public intervention is therefore necessary and legitimate to pave the way and help structure the supply, in order to create schemes capable of delivering a Factor 4 reduction of greenhouse gases emissions.

Specific Third Party Investment operators could be developed in order to manage large investments with low profitability in very long term commitments. Public entities (State, local authorities, etc.) seem to be the relevant actors for investing in such operators. Though the creation of public TPI operators does not exclude the possible participation of private capital, the presence of public entities as stakeholders contributes to a greater credibility of the structure in front of the building owners. Indeed, trust in the operator is essential for the uptake and generalisation of long-term contracts.

THE EXAMPLE OF ENERGIES POSIT’IF (ILE-DE-FRANCE)

One example of such approach is the creation in January 2013 of the public-private company Energies POSIT’IF, initiated by the Ile-de-France region (France) with the support of Caisse des Dépôts et Consignations and Caisse d’Epargne. The initiative targets the deep renovation of residential and public buildings and the production of renewable energy:

- in multifamily buildings, the main focus is to undertake EPCs in private condominiums as well as small social landlords. Energies POSIT’IF provides technical coordination of work with an energy efficiency commitment and a financing offer.
- in public buildings, Energies POSIT’IF provides consultancy to support local authorities in the negotiation process for EPCs with private operators.
- Energies POSIT’IF also provides consultancy, engineering and financial participation in projects of renewable heating and green electricity production, initiated by local project promoters.

In the residential sector, Energies POSIT’IF complements the initial support provided to condominiums by local energy agencies. When the condominium association is ready to launch the process of energy renovation, Energies POSIT’IF proposes a contract in which it is mandated by the owner to study the feasibility and the modalities for an energy retrofit operation. At the next general assembly of homeowners, Energies POSIT’IF presents a comprehensive project, with the technical specifications but also a financial engineering adapted to each individual situation. This includes for example:

- public support to co-owners or to the co-owners association: subsidies, tax rebates
- financing by co-owners: equity, soft loans (the transferability of the current 0% loan for housing retrofit to Energies POSIT’IF is under discussion with the French authorities)
- financing directly provided by Energies POSIT’IF

17. Holmes (2011)
19. IEE project MLEI NewInRetro.
20. IEE project MLEI PadovaFIT!, starting in June 2013.
21. Funded under IEE project MLEI POSIT’IF. Source: Interview with Energies POSIT’IF.
22. The Société d’économie Mixte (SEM) status requires 51 to 85 % of the capital to be held by public authorities.
Energies POSIT’IF thus facilitates access to the different funding schemes available to homeowners. If the project is accepted by the next general assembly of co-owners, a second phase is launched in which Energies POSIT’IF subcontracts the implementation of the works to the relevant companies, and takes on the maintenance of the installations in order to guarantee a level of energy consumption. The public ESCO is made of a small team which mainly negotiates the contracts and develops the financial engineering, while all technical aspects are subcontracted.

Energies POSIT’IF is designed to finance deep renovation projects with contracts between 15 and 30 years. In some cases it may not provide a guarantee on the savings, and guarantee only the intrinsic performance of the building rather than the actual consumptions. Indeed it is difficult to guarantee to its shareholders and financing partners that the structuration of the contracts and the organisation of the company allow to control the operational risks. The activity of third-party investment for co-owners associations cannot refer to other comparable experiences, hence risk allocation and mitigation is even more crucial.

Energies POSIT’IF is initially capitalised with €5.3 m for the period 2012–2014. In the longer term (2020), capital should increase to €15.5 m. The initial business plan aims to invest €40 m for the period 2013–2015. The internal rate of return in multifamily buildings is expected to range around 4 to 9 % over a 15 to 20 years term. Third-party investments will be financed through equity, access to low interest debt such as Caisse des Dépôts or EIB loans, and the sale of energy savings certificates (white certificates). The possibility of increasing capital through a Jessica investment fund is to be investigated in the coming months.

A key challenge will be to refinance the structure after all equity has been invested and no more debt can be added. A possibility is to impose the reimbursement of the investments when a dwelling is sold, as the average duration of ownership in a multifamily building in Ile-de-France is 7 to 8 years. Once a sufficient track record is established with satisfactory payment rates, Energies POSIT’IF intends to assign the contracts to financial institutions looking for long-term investments.

Providing financing for third-party investors
ESCOs or TPI operators cannot finance all investments on their equity and they need themselves to find external sources of financing. In order to enable deep renovation, it is essential that they find money with low interest rates or yield requirements, and long maturities. This is not available on the private banking market today, and requires public support which can take several forms:

- Soft loan schemes, which are usually restricted to building owners rather than directly accessible to ESCOs;
- Guarantee funds for ESCOs;
- Investment funds with reduced yield but higher environmental benefit, whether they are using subsidies as initial capital or based on the Socially Responsible Investments (SRI) concept, or community savings (e.g. SOLIRA in France);
- Debt securitisation and emission of bonds for periodical refinancing.

REDUCING THE PERCEIVED RISKS OF ENERGY EFFICIENCY INVESTMENTS
Energy conservation interventions on the building envelope are still considered too risky by most market players, even if they have been technically mastered for over a decade now in several European countries (notably in Germany and Switzerland). The offer for deep renovation remains limited, especially under energy performance contracts. Real and perceived technical and financial risks translate into higher interest rates or yield on equity, which results in lesser energy savings for a given payback time. This can be mitigated by the development of technical insurance schemes on the one hand, and financial guarantee schemes on the other hand.

Technical insurance schemes
Technical defects, revealing implementation problems, are more likely to occur during the first years of the contract. After those first years, the risk is mainly limited to the optimal conduct of the facilities (which is actually the core business of most ESCOs currently operating on the market).

Considering possible defaults during the first year of the contract, clients and financiers will seek to secure the capacity of the ESCO to assume the financial consequences of the energy performance guarantee, if it was to be applied. The issue of securing the guarantee is certainly essential for the client himself, but also represents a crucial question for facilitating the access for SMEs to EPC markets. Without an insurance mechanism, clients and banks will likely require a stand-alone or ‘corporate’ guarantee that may limit access to the market to the largest companies. The development of insurance mechanisms seems necessary for EPC market uptake and to allow SMEs to access the market.

Some insurance companies are currently developing specific energy performance insurances for ESCOs. In France, Verspieren proposes Energ’Assur, which covers the difference between the energy consumptions in the first year after retrofit and the yearly targeted consumption (i.e. adjusted on climate and in some cases use of the building) in the 4 following years. This does not cover the risk of not achieving energy savings in the first year, and it is restricted to interventions on HVAC systems. The costs are announced at €268 for a detached house, and €129 per dwelling in multifamily buildings. It remains to be seen whether such costs can be afforded by projects with small investment amounts, and whether it can be extended in the future to interventions on the building envelope.

Financial guarantees: the BGEEF guarantee Fund
Bulgaria is actively working on policies to support energy service companies. Established in February 2004, the Bulgarian Energy Efficiency Fund (BgEEF) is a public-private for-profit entity, independent from any public or private institution. BgEEF has the combined competences of a credit institution, a credit guarantee company and a consulting firm. It provides technical assistance to Bulgarian companies, municipalities and individuals in the development of investment projects in energy efficiency and then accompanies their financing, their co-financing or acts as guarantor to other financial institutions.
The Bulgarian government seems reluctant for now. All funds are now committed and the capital base must be increased, though the ECL and REECL, demand currently exceeds the financing capacity of the fund. It is in direct competition with the credit lines established by the EBRD (BEER). While it is well established on the Bulgarian financial market: although more projects will be started, ESCOs must bear the risk of payment delays which reduces the overall cost of financing.

The portfolio guarantee for ESCOs is one of the most interesting features of BgEEF. Indeed, ESCOs normally rely heavily on debt to finance their activities, which requires the cash flows from their projects to be precisely coordinated and budgeted. Delays in payment from clients, or customers defaulting, are likely to seriously disrupt the debt service of the ESCO itself. BgEEF provides ESCOs with a guarantee for delays in payments by their clients up to 5% of the total payments. Indeed, statistically customer defects do not exceed 5% of commitments and are more likely to be delayed than not paid at all. This guarantee is not project-based but portfolio-based, which allows to level the risk premium between all different projects. BgEEF acts as shock absorber and therefore reduces the cost of financing as ESCOs and banks may accept a lower Internal Rate of Return (IRR) due to the lower risk. Besides, such a product provides excellent leverage for the equity of BgEEF. For example, a guarantee of BGN 500,000 facilitates an investment portfolio of BGN 10 m, i.e. a leverage ratio of 20.

**REFINANCING ESCOS**

The investment capacity of ESCOs is limited because banks do not allow them to go beyond certain debt ratios, even with the help of guarantee funds. That is why ESCOs need to refinance their debt, i.e. to sell the claims they have over the future receivables of their contracts (energy savings). As already stated, the risk of underperformance from an EPC is more likely to occur at the beginning of the contract and becomes very low once the first years of monitoring and verification have proven the energy savings. Such contracts then become a safe revenue stream which can easily be assigned (transferred) to a bank or another institutional investor. In Berlin, this is done through forfeiting by the banks, but this may be more complicated in markets where banks are less confident in ESCOs and energy efficiency investments.

Still in Bulgaria, the Energetics and Energy Savings Fund (EESF) buys from ESCOs the future receivables of EPCs (the energy savings). Thanks to loans from the EBRD (a €7 m initial loan followed by a €10 m loan in 2012), EESF can release the ESCOs from the burden of debt and enables them to develop more projects. This is typically what Energies POSIT’IF or the City of Newcastle will need once they have a sufficient pipeline of projects.

Another solution consists in the emission of specific bonds based on the securitisation of the future energy savings. This could be implemented through the creation of a specific vehicle combining private and public equity, with a public guarantee on the first losses. The fund would pay future receivables from EPCs (guaranteed cash flows), like the EESF in Bulgaria, and then refinance itself through the emission of long-term bonds on the capital market. Bond emission would enable to raise funds at lower cost than through a usual loan, and thus to offer ESCOs better refinancing conditions. However, the emission of bonds requires a critical size and homogeneity of assets which can only be reached in a mature market.

**MOBILISING THE EUROPEAN STRUCTURAL AND COHESION POLICY**

A major source of funding for the deep renovation of buildings in the coming years will be the European Structural and Cohesion Funds. In the 2014–2020 period, the European Regional Development Fund will have a ring-fenced share dedicated to sustainable energy, amounting to 20% of the total budgets for most advanced regions, and 6% for less advanced regions. Altogether this should represent around €17 bn, which is at least twice the budget available in 2007–2013. The Cohesion Fund has no ring-fenced amount, but will also provide important funding for sustainable energy investments.

However, this must be compared to the total investments required for the EU’s 2020 objectives. Additional investments in renewable energy are estimated at €35 bn per year, while energy efficiency investments are estimated at €80 bn per year (of which €60 bn for buildings); the total is thus €115 bn, which represents 47 times the amount of ERDF money available each year (€2.43 bn). The use of ERDF through investment grants would therefore have little added value as it could only contribute to 2% of the investments.

The European Commission is pushing for an increased use of ERDF through “financing instruments”, which are currently known as Jessica, Jeremie or Jaspers. These instruments use EU money to create financial vehicles which can provide loans, guarantees, or different types of equity financing; they are by nature revolving, i.e. the reimbursements of the loans or the dividends are used for further investments. The level of return on investment of a vehicle can be freely decided and does not need to stick to market practices.

Energy efficiency funds have been identified as one of the models of funds which can be implemented through financial instruments. Those funds focus on the renovation of existing assets, but they can include renewable energy, in particular in buildings. They mainly provide long-term loans with low interest rates. These loans could be granted either to project hosts (building owners, municipalities), or to third-party investors. Such funds would naturally complement the above described schemes under development in the UK’s Green Deal (Newcas...
Another way to maximise the impact of the EU funds would be to allocate them to project development costs, i.e. the costs incurred to prepare an investment project: project management, energy audits, consultants, procurement, etc. This is currently funded for local and regional authorities under the European Commission’s project development assistance (PDA) facilities28, which require a leverage factor of 20: each Euro from the European Union must lead to €20 in investments, otherwise the grant has to be paid back. Mainstreaming this type of performance-based mechanism would ensure a higher efficiency of funding, and incentivise project developers to adopt innovative financing solutions in replacement of grants.

Scaling up

Deep renovation of the existing buildings stock is crucial in order to achieve the objectives defined for the EU in 2020 and even more for achieving the Factor 4 target by 2050. Considering the great inertia of the building sector, action must be taken rapidly in order to provide financing solutions adapted to the low profitability and long payback time of comprehensive energy refurbishment. The current financial instruments are not adapted, as they rarely target the deep renovation of buildings. Successful schemes, such as the ones we have presented in this paper, should be adapted to the buildings sector and/or to deep renovation, combined and implemented on a large scale for a higher impact.

Energy performance contracting is a central concept in most of the schemes; however, it needs to be uplifted in order to reach more ambitious targets. The role of market facilitator, as in Berlin, will be essential to structure the demand of building owners; it is a typical role for local energy agencies. Buildings need to be aggregated (by owner and/or types of buildings) in order to reach a bankable size for third-party investors. In parallel, regulations need to be adjusted to enable third-party investment, in particular to combine it with grants and to ensure that it is not accounted as debt for the building owner.

The dichotomy between the long term investments required and the short term vision of most building owner may be overcome by linking the debt to the property and collecting repayment through local property taxes, as in the PACE programmes implemented in the US. On-bill financing by energy suppliers is another efficient solution to secure repayment of the upfront costs, as in the UK Green Deal where the loan is attached to the property and collected by utilities.

Public authorities can play an active role by facilitating the emergence of demand and supply for third-party investment solutions, in particular in the housing sector. The implementation of the schemes can either be delegated to a private organisation, like in Newcastle (UK), or carried out directly through a public operator, like Energies POSIT’IF in Île de France (FR).

These initiatives, although currently starting, seem to propose the most comprehensive approaches.

The cost of financing is a crucial issue for all instruments. Besides providing soft loans for third-party financiers and/or investors, it is also essential to reduce the perceived risk of those investments by providing technical insurances and financial guarantees. ESCOs or TPI operators cannot be expected to increase their debt indefinitely, which calls for refinancing solutions such as the assignment to a specialised fund (e.g. EESF in Bulgaria), or securitisation through the emission of bonds. Public banks will have an important role to play in this field. Last but not least, the opportunities offered by the doubling of EU structural funds dedicated to energy efficiency and renewables should be seized to develop financing vehicles adapted to most of the above described schemes.

To summarise, it seems that most pieces of the puzzle are in our hands, but to assemble them requires the political willingness to make deep renovation a central objective, and not simply an option. The implementation of this vision can then only be reached through a massive capacity building programme for all stakeholders on the value chain. Public authorities, above all local and regional authorities, have a leading role to play in setting up financing schemes. They need to be able to identify the schemes which are adapted to their objectives and to their local context, and to understand the overall process to implement them. Energy agencies, often the operational arm of local authorities, need to acquire a financial expertise on top of their technical and communication expertise. The financial sector also needs to acquire a better understanding of the technical and financial features of energy retrofit projects, in order to reduce the risk they associate with such investments. ESCOs and the private sector need to develop financial skills in order to shift from the provision of energy services to the provision of comprehensive solutions including services, works, channelling of public funding, and third-party investment.

This paper provides an overview of some of the most promising solutions which can be used to finance deep renovation in buildings. Although none of them is perfect, we believe that the required financial instruments already exist and just need to be implemented, consolidated and generalised. The coming years should concentrate on the replication and multiplication of innovative financing schemes, in order to create clear business cases understood by public authorities and by the financial community; the adaptation of the legal and policy frameworks to allow the development of those schemes; and the development of the required skills for all stakeholders and public authorities.

References


**Acronyms**

BEA Berlin Energy Agency  
BgEEF Bulgarian Energy Efficiency Fund  
EBRD European Bank for Reconstruction and Development  
EESF Energetics and Energy Savings Fund  
EIB European Investment Bank  
EPC Energy Performance Contract  
ESCO Energy Services Company  
EU European Union  
HVAC Heating, Ventilation and Air-Conditioning  
PPP Public Private Partnership  
TPF Third-Party Financing  
TPI Third-party Investment  
VAT Value Added Tax