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PART 3/4

COMMISSION STAFF WORKING DOCUMENT

Good practice in energy efficiency

Accompanying the document

Proposal for a Directive of the European Parliament and of the Council amending Directive 2012/27/EU on Energy Efficiency

{COM(2016) 761 final}

Contents

7. Energy efficiency investment market: On the move!

Underpinned by a comprehensive regulatory framework, the **European market for energy efficiency is already sizeable and is expected to grow over time**. Each year, it generates around 15 Mtoe of primary energy savings[1] attributable to increased energy efficiency, mainly in transport, followed by households and industry. At the same time, it represents a significant flow of investments, as most energy efficiency projects require the mobilisation of up-front capital in order to benefit from lower energy bills in the future.

The exact size of the market is difficult to estimate. Energy efficiency investments can be accounted for in different ways and the market size varies significantly, depending on their definition[2]. Nevertheless, a number of sectorial bottom-up and top-down studies broadly outline the market.
In the building sector for instance, it is estimated that, each year, around EUR 120 billion[3] is invested into building envelopes and heating, cooling and ventilation systems. This capital expenditure should be compared with the overall EU market for building renovation which represents annually around EUR 500 billion and the market for new construction of around EUR 400 billion[4]. When looking at incremental costs, meaning the costs strictly due to energy efficiency improvements, a study[5] estimates the energy efficiency related market at around EUR 80 billion per year in the residential sector. In the area of products, a recent study[6] shows that in the EU 2020 extra acquisition costs for more efficient products will represent approximately EUR 62 billion and will result from EUR 173 billion gross savings on running costs (91% energy).

Energy efficiency measures are **mainly financed by private capital** in the form of savings from households, equity from companies, commercial debt originating from small consumer loans by retail banks to large-scale green bonds issued on the capital markets[7]. The importance of private financing is also highlighted by specific national studies[8]. This mobilisation of private financing is reinforced by a number of public schemes (around 200) across Europe which primarily take the form of grants, low interest rate credit lines[9], tax rebates or guarantees. A large share of these public support schemes target the building sector (around 80%), and estimates show that around EUR 12 billion[10] of public funds is invested each year to support the sector. At the EU level, the most important financing streams for energy efficiency are the European Structural and Investment Funds (ESIF), representing around EUR 18 billion over the period 2014-2020 for energy efficiency investments, in particular in public and residential buildings and in enterprises. Energy Efficiency has also been a beneficiary of the European Fund for Strategic Investments (EFSI) during its first year of operation, catalysing EUR

1 SWD(2014) 255 final
2 That is for example: incremental costs or full capital expenditure or motivated energy efficiency measures or autonomous investments or energy efficiency products or energy efficiency services
3 BEAM² model
4 Estimations based on the Euroconstruct data
5 Supporting study for the fitness check on the construction industry draft final report main text
6 Ecodesign impact accounting, Final – Status May 2015
7 For example, ABN Amro case presented below.
8 In France for instance, in 2013[8], 43% of the additional energy efficiency investments came from savings and equity, 34% from commercial debt, 12% from concessional debt, and around 10% from public subsidies. In Germany, in 2011, corporations and households were the most important investors in climate-specific finance, largely based on commercial loans acquired on the capital markets and concessionary loans from public banks
9 For example, Energy Efficiency Fund operated by VIPA in Lithuania, presented below.
10 Concerted Action EPBD

2.7 billion investments and accounting for more than 10% of the EFSI guarantee usage[11]. In addition, there are two specific EU financial instruments for energy efficiency, the European Energy Efficiency Fund[12] (initial capital of EUR 265 million), which provides market-based financing to public projects and PF4EE (Private Finance for Energy Efficiency)[13] which combines lending from the EIB to private banks together with guarantees and technical assistance with a view to trigger EUR 1 billion of investment.

The energy efficiency market operates in a dynamic context with different drivers, most important being macro-economic activity, energy prices and regulatory signals. All of them can stimulate or hamper the development of the market. In the current situation, low investor confidence and low energy price tend to reduce the flow of energy efficiency financing. In the longer run, the **market** will also be affected by the energy saving opportunities, which are likely to be **different to what we have experienced in the past**. Energy efficiency measures will become more complex to implement: the potential of economically-viable energy savings in areas such as products will shrink as time goes by and more savings will have to come from the renovation of existing buildings (where there is still a significant potential for cost-effective energy savings but projects are more complex and more challenging to finance). On the other hand, changes in the role of consumers, the growing share of renewables and decentralised generation, energy storage, fast-changing ICT technologies, new products, materials or construction processes will open new horizons and create opportunities for existing and new market actors. These will trigger new business models developed around services, with new financing models exploiting the multiple benefits of energy efficiency, as well as new revenue streams from demand response mechanisms.

Taking advantage of these new energy efficiency business opportunities will require the establishment of an appropriate policy framework together with attractive financing solutions to secure the mobilisation of sufficient private capital. It will require addressing a number of market failures and **finance allocation patterns**. The following chapter presents market good practise and inspiring examples supporting the three key pillars of the **Smart Finance for Smart Buildings Initiative**, namely:

- more effective use of public funding;
- aggregation and project development assistance; and
- de-risking of energy efficiency investments market.

7.1. Effective use of public funds to mobilise EE investments

Energy efficiency is not and cannot be financed purely from public funds as benefits are predominantly private and there will never be sufficient availability of public funds. A key challenge is to maximise the impact of public funding by leveraging private capital and developing financing instruments (such as loans and guarantees), while using non-reimbursable grants in cases where needed to address market failures. Due to the nature of energy efficiency investments (high upfront costs and stable long-term revenues) debt financing instruments have been progressively developed and launched, enabled by public finance.

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11 Under the EFSI Infrastructure window.

12 Set up in 2011, the initial capitalization of the fund is EUR 265 M and it aims at attracting private investors, to reach a total size of EUR 700 million.

13 Launched in January 2015, PF4EE is a financial instrument to drive investment in energy efficiency. It combines lending from the EIB to intermediary banks in Member States with guarantees and technical assistance provided by the Commission's budget (€80 million from LIFE+ committed for 2014-17). It is anticipated that it could finance around EUR 650M.

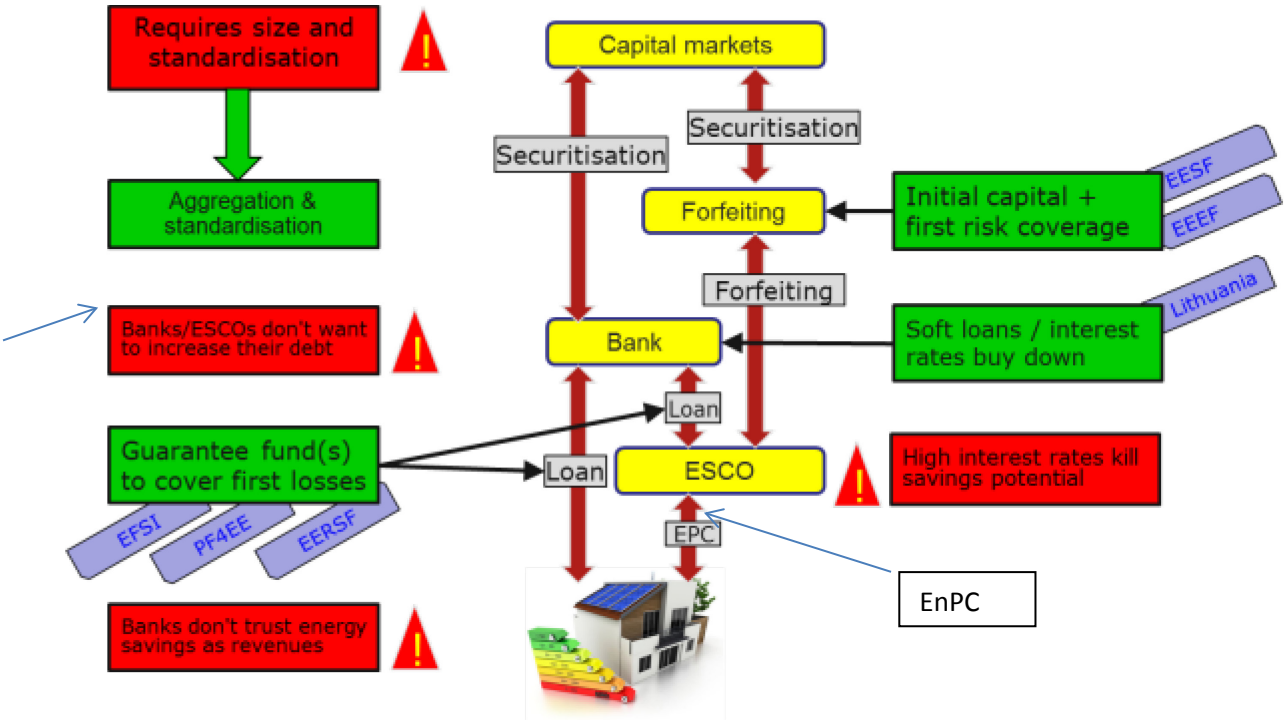
Public funding can be used in many different schemes, which frequently include the establishment of new legal and administrative mechanisms. Experience has shown that financing schemes need to be customised to regional/local socio-economic, legal and banking conditions. Typically, these schemes involve a combination of EU funding bodies, national or regional governments, energy agencies, municipalities, public financial institutions, commercial banks, local retail banks, energy companies, installers, housing agencies and associations, home owners, ESCOs and project consultants. The key issue is the proximity of financing schemes to their final users and usage of natural money distribution channels that are known and trusted by borrowers.

As illustrated in figure 52 below, public money can be used to reduce the cost of capital (which means lending money at rates below market prices), to provide loans with longer maturities or lower collateral requirements. Such "soft loan" schemes are increasingly used across the EU and have demonstrated their effectiveness, as can be seen below in the examples of Lithuania, Germany and Slovakia.

Public funds can also be used to absorb the risk of default on energy efficiency loans, which is traditionally perceived as rather high by financing institutions (this is further explained in chapter 7.3). This can be addressed through risk sharing instruments, such as guarantees on loans to project owners or to ESCOs.

A secondary (re-financing) market for energy efficiency investments needs to be created in order to allow investors/lenders to refinance their assets and invest their money into new projects. This is especially important in the period post-COP 21, where large institutional investors are keen to re-allocate their asset holdings in areas such as renewable energy sources or energy efficiency (refinancing is further explained in chapter 7.3).

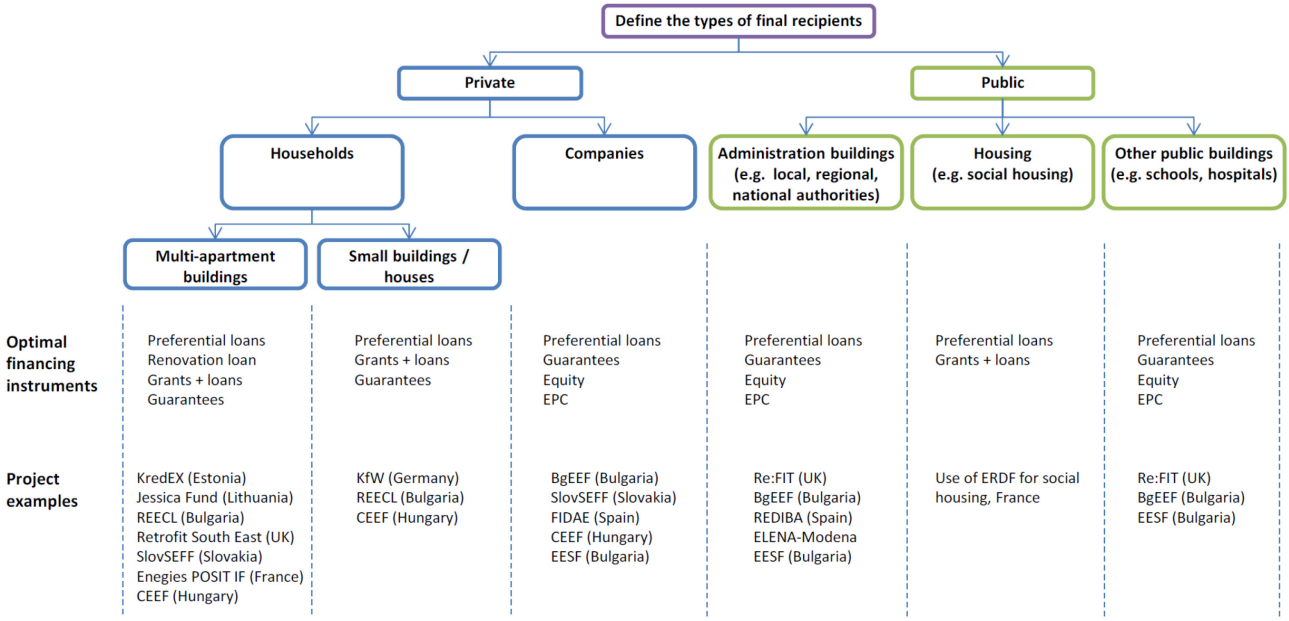
Figure 54: Public schemes to support energy efficiency finance



Source: adapted from Adrien Bullier, ECEEE 2013

For the building sector, the figure below provides an overview of different schemes which are being implemented across Europe, depending on the target group and type of financing instrument chosen.

Figure 55: Financing options depending on type of final recipients



Source: Technical guidance – Financing the energy renovation of buildings with Cohesion Policy funding, Final report- A study prepared by the European Commission DG Energy, 2014

7.1.1 Loan schemes co-financed by public funds

- ***Revolving loan fund for multifamily building renovation (Lithuania)[14]***

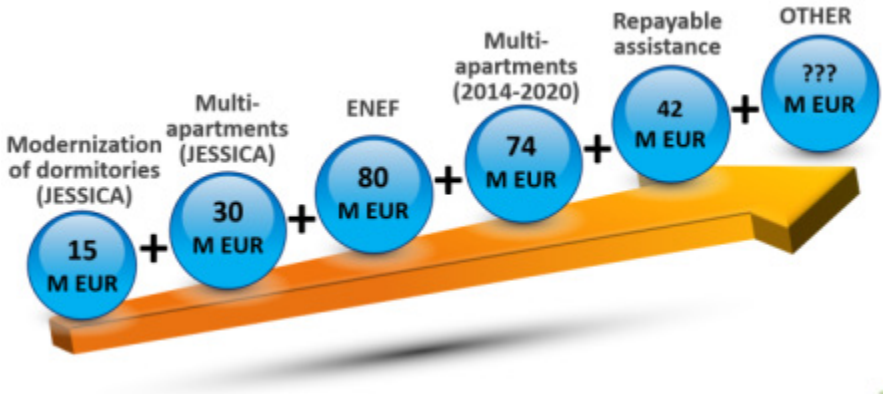
The Public Investment Development Agency (VIPA) is fully owned by the Lithuanian Ministry of Finance and was established to develop and implement innovative financial instruments for public infrastructure development. VIPA's objective is to foster energy efficiency market funding independently from the state and the European Union by recycling its initial funding, and by strengthening capital markets' presence, to broaden and diversify funding sources. VIPA only acts in sectors where funding gaps and market insufficiencies exist.

VIPA is involved in assessment and evaluation of the market, creation of financial models, developing innovations for financing energy efficiency and other (sector) projects, development and implementation of financial instruments funded by European structural and investment funds, identifying, evaluating, promoting and financing projects.

VIPA implements financial instruments in the public sector using a variety of resources including ESIF. In February 2015, the first fund of funds in the European Union using ESIFs 2014-2020 was established. The current priorities are energy efficiency in public infrastructure (e.g. municipal and state buildings, street lighting) and residential apartment buildings. Since its establishment, up to the second quarter of 2016 VIPA has mobilized and managed more than EUR 240 million.

[14] Source: VIPA presentation *'Financial instruments in Lithuania for energy efficiency and public infrastructure development*' available at: http://www.betalt.lt/wp-content/uploads/2014/01/Financing-VIPA-20151210.pdf

Figure 56: VIPA funds under management



Source: VIPA, 2016

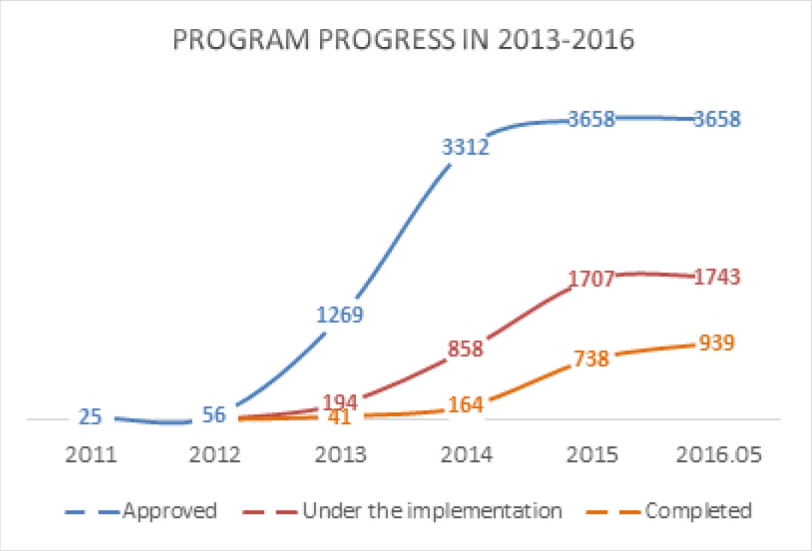
The main features of the most successful residential building modernisation financial product are:

- fixed interest rate at 3%;
- maturity up to 20 years;
- up to 2 year grace period (during construction);
- no collateral;
- 15% written-off if 20 % savings attained and energy efficiency Class C achieved (upon completion);
- extra 25% (gradually decreasing to 15% in 2018) subsidy from national sources if savings reach 40%.

The residential building modernisation programme became extremely successful when corrective measures were introduced by the Lithuanian government:

- municipalities were involved by drawing a list of the worst-performing buildings and mandating/requiring them to appoint renovation administrators, who could do off-balance borrowing on behalf and in favour of apartment owners;
- to implement modernisation project it is sufficient that 50% +1 of apartment owners vote in favour;
- compensation of monthly loan instalments to indigent apartment owners;
- gradual phase-out of heating bill compensation for indigent apartment owners who vote against modernization;
- technical and financial support for all related parties for preparation and implementation of projects (paid from national funds).

Figure 57: Residential building renovation project pipeline, in units



Source : VIPA, 2016

Due to investment demand being substantially higher than available funds, VIPA works on potential schemes to attract additional sources.

Combination of loans, technical assistance and grants for renovation of multi-apartment buildings (Estonia)

In 2009, at the height of the financial and economic crisis, **Estonia** established a loan fund for multi-apartment buildings – becoming the first MS to channel cohesion policy funding into apartment building renovation programmes. The instrument brought together EUR 17,7 million from the ERDF, a EUR 28.8 million loan from the Council of Europe Development Bank (CEB) and EUR 20,2 million from national resources, and was implemented by KREDEX, a national promotional development bank, as holding fund manager and two commercial banks as financial intermediaries. So far (at November 2014), more than 600 buildings have been renovated resulting in improved energy efficiency and living conditions in more than 22 000 apartments. The renovation loan programme, combining advantageous loans with project development assistance and performance based grants, is continued in the 2014-2020 period, with private sector financing and reflows from the previous period[15]. The scheme is a prime example for the sustainable financing through financial instruments, as public support to the guarantee scheme comes exclusively from reflows of the previous period.

[15] Source: DG REGIO, European Commission

Figure 58: A financed project example- renovation of the apartment block in Tallinn (before and after)

Source: Renovation loan programme- Case Study; Fi compass[16]

- ***KfW loans for energy renovation (Germany)***

The **German** state-owned Bank for Reconstruction manages two programmes to improve the energy efficiency of residential buildings, one targeting the construction of new buildings and the other the refurbishment of existing buildings. Both programmes offer a choice of upfront grants or soft loans, which may have a grant component. The amount of grant depends on the energy efficiency level achieved: the higher the energy efficiency, the better the financing arrangement[17].

To be eligible for the programme, it is a precondition that the efficiency standards achieved by the project are better than the minimum requirements as set out in the German Energy Savings Ordinance. Eligibility is based on two key parameters: (1) the annual primary energy demand compared to the demand of a new building (the so-called "reference building") and (2) the structural heat insulation (specific transmission heat loss) compared to the reference building.

Based on monitoring reports[18], final programme energy savings for the period between 2009 and 2013 amounted to more than 28 000 GWh by the end of 2013. Additional employment effects are estimated to be 79 000 person years due to total investments of EUR 6,5 billion, of which EUR 1 billion directly returns to the state in the form of VAT.

In terms of key success factors, KfW makes use of a scaling system for building energy efficiency, according to which the amount of funding is tied and linked to Germany's minimum energy performance standard (MEPS). If the MEPS is tightened, the scaling system's criteria nearly automatically become stricter. In addition, KfW makes use of established structures (local commercial bank offices) to facilitate loans. A benefit for the investor is that the system is transparent with all information available online.

KfW's programmes can be seen as unique instruments, as it is able to raise capital at low costs thanks to the implicit guarantee of the German government, which makes KfW bonds very attractive to investors.

- ***SlovSEFF (Slovakia)***

SlovSEFF, conceived and managed by the EBRD in cooperation with the **Slovak** National Authorities and local retail banks, has successfully financed investments in residential and industrial energy efficiency and renewable energy since its start in 2007. SlovSEFF was launched with an amount of

16 https://www.fi-compass.eu/sites/default/files/publications/case_study_renovation_loan_programme_estonia_0.pdf

17 EEW Case Study http://www.energy-efficiency-watch.org/index.php?id=213

18 Diefenbach et al. 2010, 2011, 2012, 2013, 2014

EUR 60 million and was extended in 2010 with an additional EUR 90 million in EBRD financing to local banks. Donor funding was initially provided by the Bohunice International Decommissioning Support Fund (BIDSF) for incentive payments and technical assistance (Phase I and II), followed by the use of proceeds from the sale of Slovak greenhouse gas emission allowances (Phase III, just started).

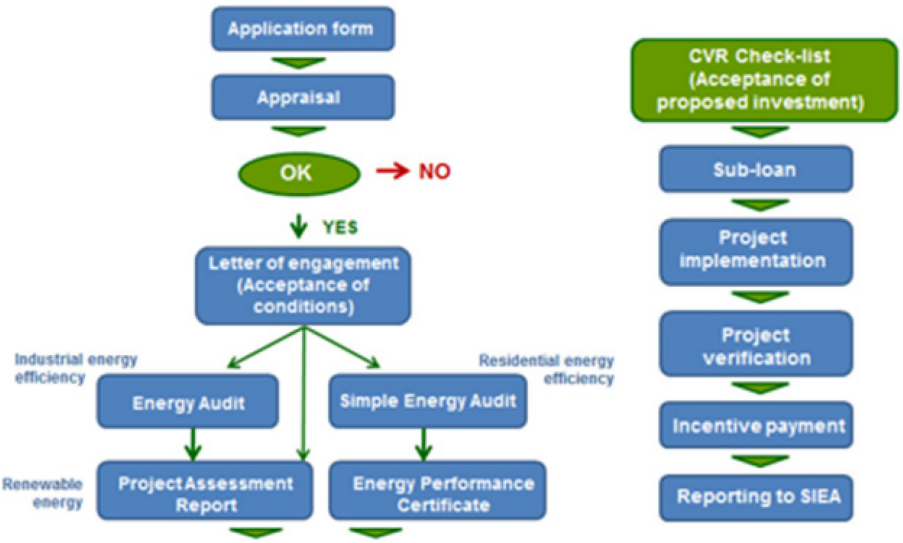
The EBRD extends credit lines to local financial institutions to develop energy financing as a permanent field of business. Local financial institutions act as intermediaries and lend the funds to their clients (small and medium-sized enterprises, corporate and residential borrowers) to undertake energy efficiency savings projects or to invest in small-scale renewable energy generation.

SlovSEFF also provides technical assistance to financial institutions and their clients. Borrowers are provided with assistance in identifying energy saving opportunities through energy audits and are advised on high performing technologies. Technical assistance is provided by external, local consultants: the Project Consultant and the Verification Consultant.

Incentive payments are provided to kick-start markets by incentivising financial institutions and borrowers to comply with higher standards for energy efficiency and renewable energy projects. The main barrier to the implementation of energy efficiency projects are long payback times and a large upfront investment. Incentive payments have helped to correct these market barriers. In SlovSEFF II, for housing projects 10% of the loan was paid as an incentive if 15% of energy savings were achieved and 15% of the loan if savings were larger than 25%. For industrial energy efficiency projects, incentive payments represented 7,5% of the loan amount once the IRR was larger than 10%[19].

Audits are the integral part of the programme (energy audits for industrial energy efficiency, simple energy audits for residential energy efficiency) to identify and confirm best energy/carbon saving measures. The release of incentive payment follows a rigid verification structure: the independent consultant verifies the project and notifies the participating bank which then approves it and notifies the EBRD. Following the project verification, the incentive payment of Carbon Reduction Compensation is disbursed. Annual GHG emissions and energy savings have to be reported to the Slovak Innovation and Energy Agency (SIEA) for a period of 5 years after project completion. The following figure provides an overview of how SlovSEFF works.

Figure 59: SlovSEFF scheme



Source: EEW3 Case Study: The Slovak Energy Efficiency and Renewable Energy Finance Facility[20]

19 (EBRD 2014).

20 http://www.energy-efficiency-watch.org/index.php?id=213

SlovSEFF also aims at transferring and building expertise among banks and companies related to sustainable energy investments. By improving energy efficiency and utilisation of renewable energy, it also aims at mitigating electricity price increases.

It is estimated that 31 184 households and therewith 86 376 residents benefitted from the refurbishments[21].

In total 688 projects were funded under SlovSEFF I and II. A 2014 evaluation by the EBRD shows that the largest share of projects took place in the housing sector (87%) followed by the industrial sector (11%) while renewable energy projects represented only 2%. When considering the allocation of funds, 61% went to housing, 27% to industrial projects and only 12% to renewable projects.

SlovSEFF I and II jointly achieved annual primary energy savings of 580 000 MWh (compared with a target figure of 504 000 MWh) and result in total annual CO_2 savings of 114 000 t.

7.1.2 Risk-sharing instruments

- ***European Fund for Strategic Investments (EFSI)[22]***

EFSI is an initiative launched by the EIB Group - European Investment Bank and European Investment Fund - and the European Commission to help overcome the current investment gap in the EU by mobilising private financing for strategic investments. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around Europe to ensure that money reaches the real economy. Its objective is to unlock additional investment of at least EUR 315bn until the end of 2017.

EFSI is a EUR 16 billion guarantee from the EU budget, supplemented by a EUR 5 billion allocation of the EIB's own capital. EFSI has been integrated into the EIB Group and projects supported by EFSI are subject to the normal EIB project cycle and governance.

With EFSI support, the EIB Group provides funding for economically viable projects where it adds value, including projects with a higher risk profile than ordinary EIB activities. It focuses on sectors of key importance where the EIB Group has proven expertise and the capacity to deliver a positive impact on the European economy.

EFSI is demand driven and provides support for projects everywhere in the EU, including cross-border projects. There are no geographic or sector quotas. Projects are considered based on their individual merits.

Energy Efficiency has been an important beneficiary of EFSI during its first year of operation (see chapter 7.2.3), catalysing EUR 2,7 billion investments and accounting for more than 10% of the EFSI guarantee usage[23]. Out of these projects, some are combining ESIF/other public funds and EFSI funds in a way to provide risk sharing and technical assistance.

A good example is the CAP TRI investment fund project in **Nord-Pas-de-Calais** showing how to usefully combine ESIF and EFSI support, in particular as it enabled maximising the private sector participation[24]. The project is a part of a low-carbon economy strategy in the region (Third Industrial Revolution - TRI) intending to make the Region a "zero- emissions" energy model by 2050, while at the same time creating employment, developing the overall economy and combating fuel poverty. CAP TRI a "layered" fund which invests risk capital in enterprises developing TRI projects: the Region

21 SlovSEFF 2015

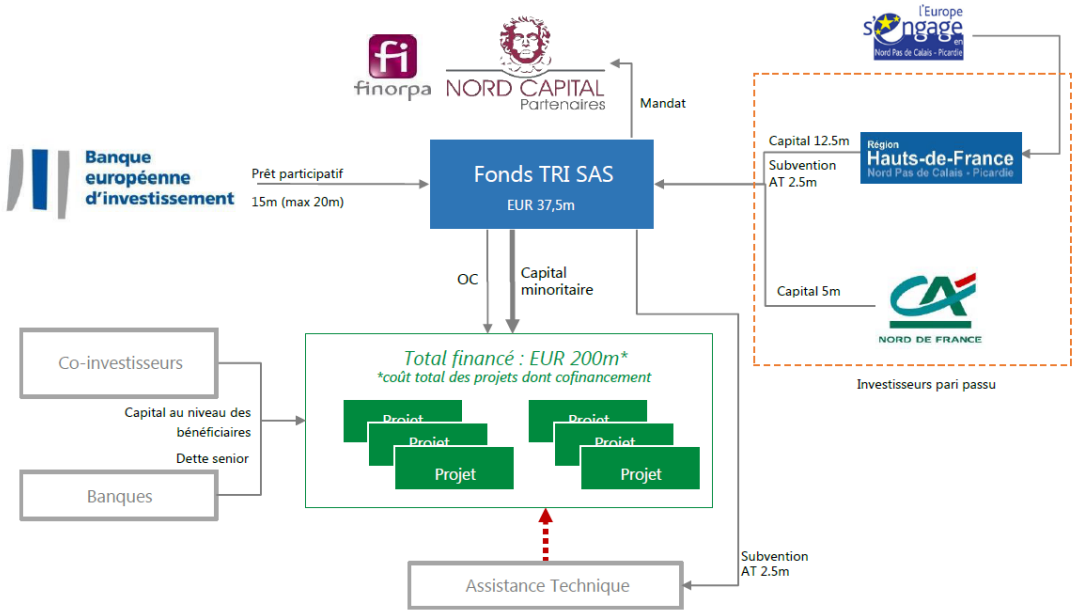
22 http://www.eib.org/efsi/

23 Under the EFSI Infrastructure window.

24 http://europa.eu/rapid/press-release_MEMO-16-1967_en.htm

participates, using European Regional Development Fund (ERDF), providing equity financing alongside public and private investors. The EIB, supported by the EFSI, provides mezzanine debt to the fund and commercial banks provide senior debt at project level. In addition to financing, the Region also offers technical assistance thanks to a grant of up to EUR 2,5 million drawn from ERDF resources. The investment projects eligible to CAP TRI financing are in the field of renewable energies, energy efficiency, energy management and smart grids, smart transport and circular economy.

Figure 60: CAP TRI funding scheme



Source: Diaporama du Fonds CAP TRI, la région Hauts-de-France

Private Finance for Energy Efficiency (PF4EE)[25]

The PF4EE is an **EU** Financial Instrument developed by the European Commission together with the European Investment Bank (EIB) aimed at increasing investments in Energy Efficiency through debt financing (Energy Efficiency loans) provided by private Financial Institutions (FI) to final recipients.

PF4EE has a budget of EUR 80 million for the risk-sharing and expert support facility (from the EU's LIFE+ Programme) for the 2014-2017 period. It is made up of three main elements:

- Energy efficiency loans provided by the EIB to Financial Institutions participating in the PF4EE.
- A risk sharing mechanism providing cash collateral to Financial Institutions to cover up to 80% of their expected losses in dedicated energy efficiency loans portfolios.
- An expert support facility to assist Financial Institutions in setting up a framework to identify, evaluate, and ensure the financing of projects (a maximum amount of 3.2 million euro can be allocated to this expert support facility across the EU).

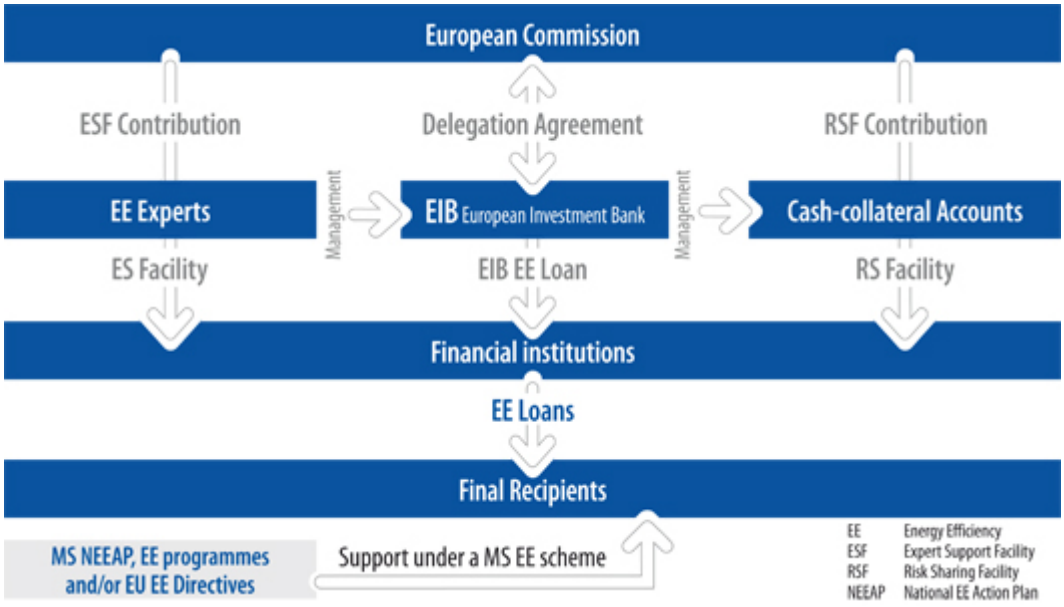
The PF4EE aims to increase lending activity and to provide better financing conditions for energy efficiency projects (e.g. lower interest rates, longer maturities, reduced collateral). This is achieved mainly through the risk sharing facility, which reduces the credit risk faced by financial institutions when lending to final recipients. One FI can be selected from a given country and no more than 15% of the EU contribution can be allocated to one single country.

25 http://www.eib.org/products/blending/pf4ee/index.htm

Eligibility

- The potential counterparts of the PF4EE are private financial institutions that demonstrate capacity to target final recipients in line with the EE national priorities.
- The investments to be financed by the EE loans should be consistent with the Member State's National Energy Efficiency Action Plan or an energy efficiency national programme or scheme and the resulting energy savings should cover at least 50% of the project cost.
- The EE loans can range from 40 000 Euro up to EUR 5 million26 and any natural person or legal entity undertaking can be a final recipient of this instrument.
- Since its launch at the end of 2014, the PF4EE has signed three operations:
- Lending programme with Komerční Banka, a.s., Czech Republic: this scheme provides targeted energy efficiency loans for businesses and industry. The EIB has committed a loan of EUR 75 million (EUR15 million disbursed so far)[27].
- Spanish lending programme with Banco Santander: addressing energy efficiency in Hotels sector. The EIB has committed EUR 50 million of debt financing (EUR 20 million distributed so far).
- French lending programme for refurbishment of buildings and energy efficiency measures in businesses, with Credit Cooperatif. The EIB has committed a loan of EUR 75 million.

Figure 61: PF4EE scheme



Source: EIB

- ***European Energy Efficiency Fund***[28]

The European Energy Efficiency Fund was created by the European Commission and the EIB to provide specific and tailored financing for energy efficiency projects originated by public sector entities. The Fund was capitalized with EUR 265 million provided by the European Commission, the European Investment Bank, Cassa Depositi e Prestiti and Deutsche Bank, the latter being also the

26 The EE loans can be reduced to accommodate small investments in the residential sector and can go up to 10 million euro in exceptional cases.

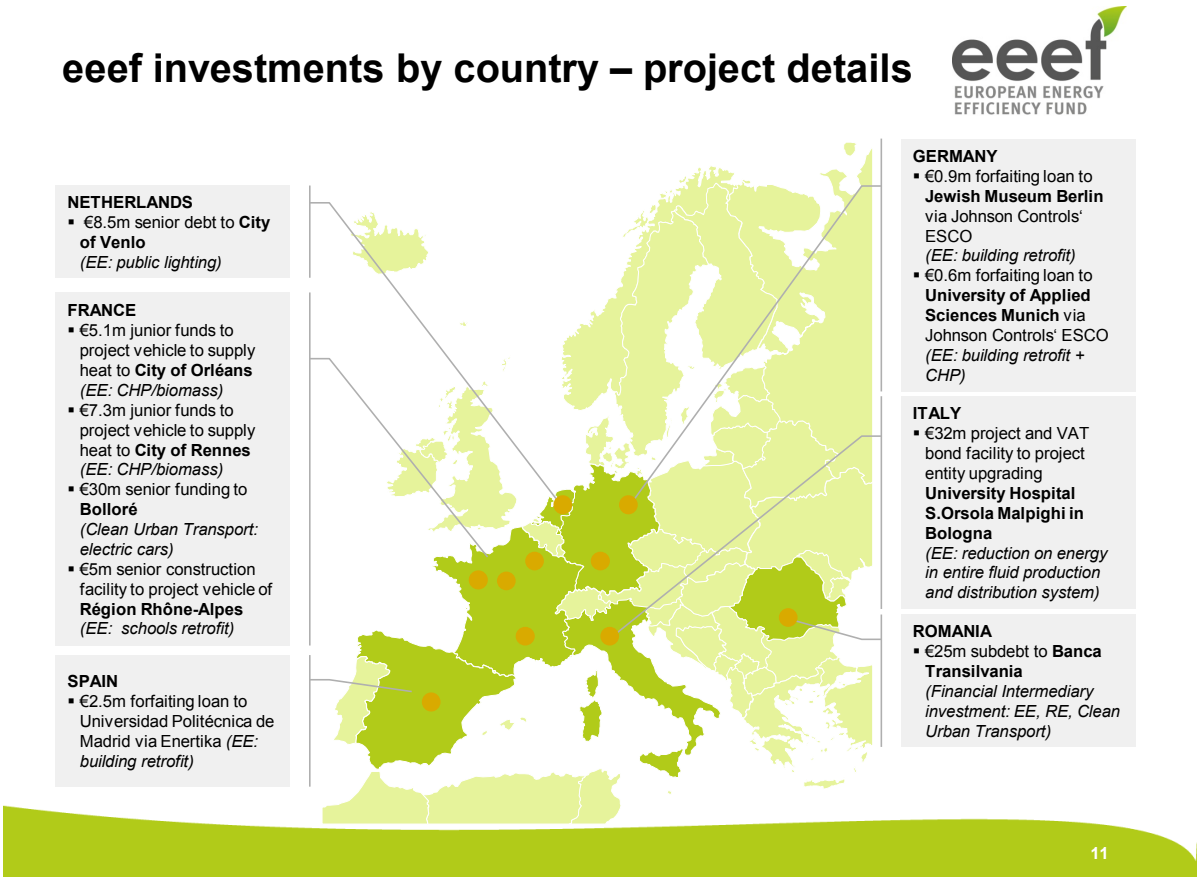
27 i.e. by the end of 2015

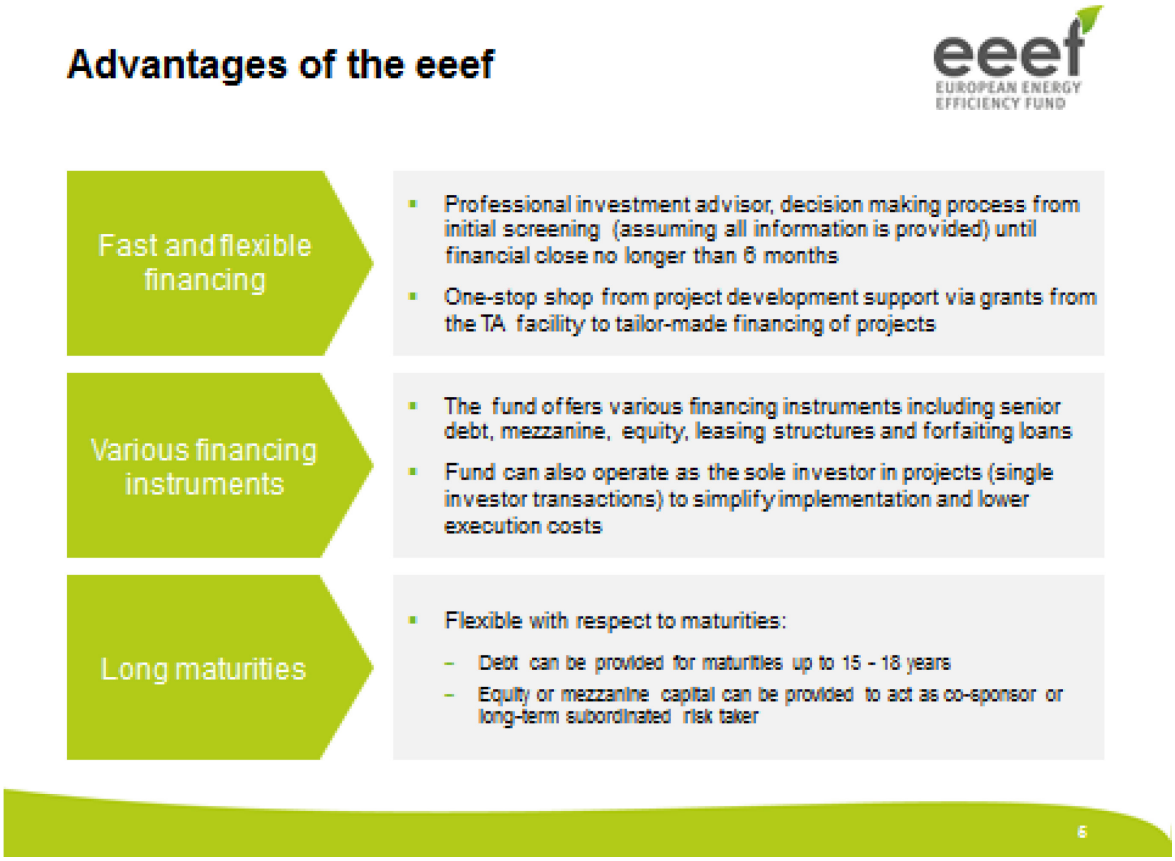
28 http://www.eeef.eu/

Fund manager. As a layered structure, EU public funds were used as a "first-loss" capital tranche, enabling to de-risk the private capital entry into the facility. The Fund aims to attract additional private investors to enlarge the scope of its portfolio.

The Fund offers debt, equity and forfaiting finance for mature energy efficiency, renewable energy and clean urban transport projects. As of today, there are 10 projects in its portfolio, presented below. The Fund offers variability and flexibility in its operations, and beneficiaries can use the ELENA Technical Assistance to develop their investment projects, to be potentially funded by the Fund.

Figure 62: EEEF projects map





Source: EEEF (2016)

- ***EERSF loan and guarantee fund for ESCOs (Bulgaria)***[29]

Established in February 2004, the EERSF (Energy Efficiency and Renewable Sources Fund) is a **Bulgarian** public-private for-profit entity, independent from any public or private institution. EERSF 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.

EERSF offers three main financial products:

- direct loans to projects,
- partial credit guarantees to ESCOs reducing the credit default risk, and
- portfolio guarantees reducing the risk of payment delays.

The portfolio guarantee for ESCOs is one of the most interesting features of the EERSF. 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. The EERSF 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 levelling the risk premium between all different projects. The EERSF acts as shock absorber and

[29] Quoted from Bullier, A., Milin, C., Alternative financing schemes for energy efficiency in buildings, ECEEE 2013; www.managenergy.net/lib/documents/868/original_3-221-13_Bullier_-_Alternative_financing.pdf

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 EERSF. For example, a guarantee of BGN 500 000 facilitates an investment portfolio of BGN 10 million, i.e. a leverage ratio of 20.

7.1.3 Grant schemes

- ***Subsidies paid directly to installers.***

The Energy Company Obligation is a **UK** scheme which provides funding for energy efficiency improvements. Unlike most other schemes, payments for improvements go straight to the installers (not the resident), ensuring that funds are actually used to pay for energy efficiency improvements, and making it easier for residents to manage payments in multi occupancy buildings. This system limits consumer choice of installer, but in some situations this drawback is outweighed by the advantage of simplifying the payment process.

- ***Scottish area based programmes for home energy efficiency improvements.***

In **Scotland**, the Home Energy Efficiency Programmes' (HEEPS) Area Based Schemes form a 10 year programme which is funded by the Scottish Government and tops up Energy Company Obligation (ECO) funds. Schemes are delivered through local authorities, who are best placed to understand the nature of local housing provision and co-ordinate a local supply-chain. The programme is focussed on the most deprived areas in the country and hard-to-treat measures, such as external wall insulation (with previous programmes having installed easier low-cost measures).

- ***Sustainable Development Income Tax Credit (France)***[30]

The Sustainable Development Tax Credit (CIDD) in **France** is a tax credit for the purchase of the most efficient materials and equipment in terms of energy consumption and greenhouse gas emissions. Cost of labour is only covered in the special case of the installation of opaque external wall insulation and ground source heat pumps.

This scheme was launched in 2005 and about 8 million households have used the facility. CIDD is available for homeowners and tenants (also occupants who do not pay rent).

Only renovation work in existing buildings is eligible, except in the case of renewable energies, which may be financed for both new and existing buildings. A range of improvements are accepted: insulation of floor, roof, window and front door; insulation of heat or water distribution systems; installation of heating regulation equipment; domestic hot water equipment; energy producing equipment using renewable energy; and connection to a district heating fed by renewables or cogeneration system.

- ***Sustainable Construction Programme in Andalucía (Spain)***[31]

The Sustainable Construction Programme in Andalucía in Spain ('PICSA'), co-financed by EUR 133 million from the ERDF, invested in the energy renovation of buildings and the rehabilitation of urban areas, boosting the competitiveness of the construction sector and the creation of skilled employment. boosting the creation of skilled employment while reducing energy poverty for low income families. The work done to improve energy efficiency in buildings has led to an estimated reduction in CO2 emissions of 62 000 tonnes and energy savings of about 26 000 toe/year. Around 14

30 Source: MURE database

31 http://ec.europa.eu/regional_policy/en/projects/spain/making-andalusias-construction-sector-more-sustainable

000 jobs have been created. Vulnerable groups have benefited greatly, with improved housing quality for more than 7 000 low income families. Moving forward, measures contained in the development plan are expected to generate 80 000 new jobs over the next five years. To help make this happen, EUR 529 million of extra funding has been allocated until 2020.

- ***Energy Performance Certificate requirements for access to public grants (Italy)***[32]

Energy Performance Certificates (EPCs) can be used as an evidence of the quality of energy-related renovation. In the residential sector, EPCs are already being used in many countries as a document necessary to obtain financial support and subsidies for increased energy efficiency. In 2015, EPCs were required in 10 EU Member States to prove eligibility for such schemes, most often both before and after the renovation. In this context, EPC quality assurance plays a key role in a growing number of Member States.

In **Italy**, the tax deductions available in 2014 have been in effect since 1 January 2007 and are designed solely for the energy refurbishment of existing buildings. The deductions are available for homeowners and tenants, and for businesses (deductions limited to buildings used for their activities). To be eligible for tax deductions, any intervention must comply with certain energy performance requirements, which vary according to the type of operation and must be more demanding than the minimum requirements prescribed by law and pursuant to the decree transposing the EPBD. In order to qualify, it is necessary to provide an EPC after the intervention.

Main overall results (2007 – 2012):

- about 1.5 million applications;
- energy savings of more than 9 000 GWh/year;
- environmental benefit in terms of avoided CO_2 emissions more than 1,900,000 ton/year;
- approximately 6,2% of Italian property is involved in energy improvement (partial or total), which has been able to take advantage of tax deductions of 55% or 65%.

The highest number of interventions over the years has been the replacement of lighting fixtures, while the greatest contribution to energy savings achieved can be attributed to the interventions carried out on heating systems. The overall results are summarised in figures below[33].

[33] CA EPBD (2016) – Implementing the Energy Performance of Buildings Directive (EPBD) – Featuring Country Reports Available at: https://www.dropbox.com/s/vaq0h8if64ypmlh/CA3-BOOK-2016-web.pdf?dl=0

Figure 63: Number of renovations per type of intervention

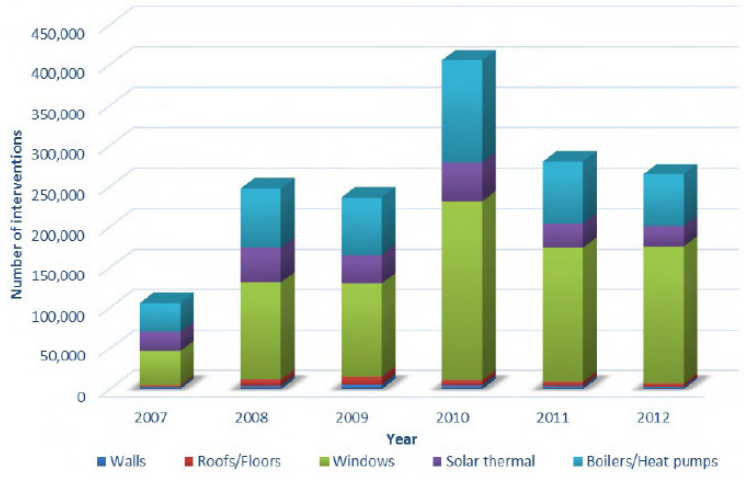
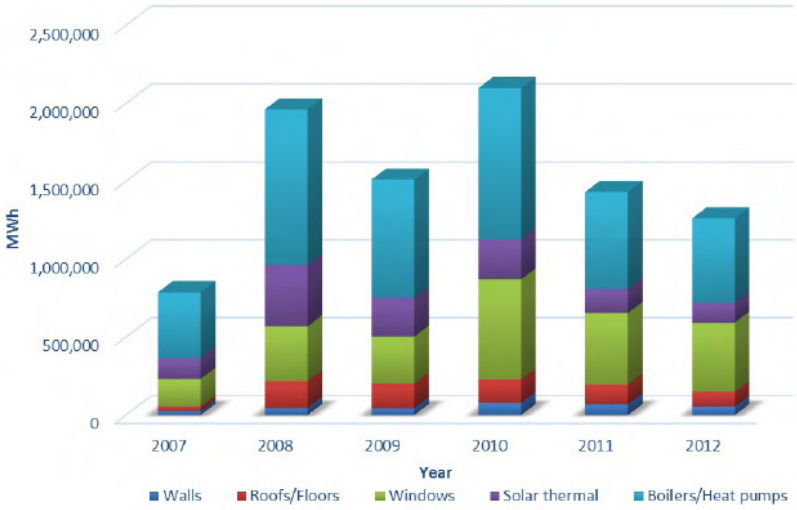


Figure 64: Energy saved per type of renovation



Source: CA EPBD (2016) – Implementing the Energy Performance of Buildings Directive (EPBD)

7.2. Aggregation and assistance

Many **cities, individuals or businesses are not trained**, or experienced **in developing sizeable energy efficiency projects** and they perceive these operations are being unknown, complex and linked to challenging decision-making processes. They lack the necessary technical, organisational, legal or financial capacity to set up, implement and finance such projects. They may lack experts able to perform thorough energy audits, to develop technical specifications for public tenders, to define the most appropriate procurement procedure, or to find the most suitable financing solutions. These skills are often not readily available in-house or are expensive to sub-contract. As a result, a large number of project promoters are not transforming their ideas into concrete investments, and underdeveloped project pipelines become an important bottleneck to the development of the market.

In this context, most project promoters need assistance. This is the purpose of project development

assistance (PDA), which the EEFIG report[34] identified as key to create a large-scale pipeline of bankable projects.

Project Development Assistance can be provided via different instruments such as dedicated PDA facilities, investment platforms[35], local "one-stop-shops" or dedicated services. A large variety of market actors can be involved in PDA activities including local and regional authorities, ESCOs, banks, energy agencies[36] or utilities, usually with a local or regional scope. It can also encompass a wide array of activities including: consumer information, energy audits, proposal for packaged solutions, financing advice, tendering procedures, quality assurance and monitoring.

In addition to triggering action, Project Development Assistance facilities are essential to develop mechanisms **for the aggregation of small scale and fragmented energy efficiency transactions**. This is key to increase the size of energy efficiency investments, generate economies of scale, reduce transaction costs and make projects more appealing to investors.

Public funding can be allocated very effectively to support PDA activities and bridge the capacity gap that inhibits the development of investment-grade projects. At **EU level**, the Intelligent Energy Europe and Horizon 2020 programmes have been funding different Project Development Assistance Facilities, notably the **European Local Energy A**ssistance (**ELENA**) facility and the **PDA call**. These facilities have so far provided about EUR 130 million to about 127 projects, resulting in more than EUR 6 billion of expected investment. The minimum required leverage factor (that is, each EUR provided in assistance is required to trigger at least EUR 15 to 20 in investment) has been overachieved, confirming the positive effects of empowerment of project promoters by knowledge[37]. The ELENA Facility is being reinforced through additional capacity provided under the European Investment Advisory Hub[38], created to provide investment support to project promoters under the Investment plan for Europe. Most of the emerging models to develop and finance energy efficiency investments have been funded under either ELENA or the PDA call of Horizon 2020: *Energies Posit'If*, *Picardie Pass Rénovation*, *Padova FIT!*, *RE:FIT*, as well as a series of projects which aggregate small investments in public buildings and street lighting in order to jointly procure energy performance contracts.

At the **national, regional and local level**, an integrated approach is required to create demand for energy efficiency investments, trust in contactors, and to increase the capacity of those along the value chain. Furthermore, an integrated solution would tie-in various sources of financing, ultimately connecting the attractive supply of finance with demand. Such solutions could include, for instance **One-stop-shop** approaches that cover the whole customer journey from information, technical assistance, structuring and provision of financial support, either through specific public-private vehicles or by the private sector, to the monitoring of savings. To achieve this complete and seamless offer, one-stop-shops have to provide support to both the supply or demand (customer) side and they generally include the following interventions: communication and information campaigns, training and building skills in the supply chain, financing mechanisms, and energy performance tracking (before and after). The figure below explains the main services provided under a one-stop-shop for building renovation:

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34 www.eefig.eu

35 Investment Platforms definition according to the EFSI Regulation: "*special purpose vehicles, managed accounts, contract-based co-financing or risk-sharing arrangements or arrangements established by any other means by which entities channel a financial contribution in order to finance a number of investment projects…*

36 400 local and regional energy agencies exist across the EU, that can provide the needed technical and economic capacity and expertise.

37 PDA evaluation report

38 http://www.eib.org/eiah/about/index.htm

Figure 65: One Stop Shop for building renovation

Source: REQUEST project[39]

The experiences presented below represent different concepts which can be adapted and replicated in many regions of Europe.

Last, but not least, there is still a major lack of skills across the value chain which needs to be addressed through flanking measures such as capacity building and stakeholder dialogue.

7.2.1 Assistance to facilitate the use of Energy Performance Contracts

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

EnPC are interesting contractual arrangements as they allow facility owners and managers to upgrade ageing and inefficient assets while recovering the necessary capital directly from the energy savings guaranteed by the EnPC providers. However, these projects are often complex to set up and project promoters often lack the necessary expertise to go through that process.

39 http://building-request.eu/sites/building-request.eu/files/REQUEST%20Project%20Summary%20Report_FINAL.pdf

Different experiences have shown that a local EnPC market can be developed with the support of a 'market facilitator', i.e. an entity which not only helps clients to prepare, procure and manage an EnPC, but also structures the market by training ESCOs, providing template contracts, and informing all market actors[40]. Based on the successful example of Berlin's Energy Savings Partnership, several regions in Europe have implemented market facilitation services with success, often in the framework of EU-funded projects.

- ***EESI2020, market facilitators to assist the development of the EnPC market***

The EESI 2020 project[41] supported the development of the EnPC market by providing direct training to 800 potential facilitators, and by establishing a guide on the typical tasks and responsibilities of EPC project facilitators. In addition, it demonstrated the importance of this local assistance by implementing 27 EnPC pilot projects which triggered almost EUR 27 million of total investments in energy efficiency, e.g.:

- In the **Czech Republic**, the offices and the beautiful concert hall of the Czech Philharmonic Orchestra with a net floor area of 16 957 m2 was renovated under a 9 year contract. The cooling and air conditioning systems were renewed, a heating control system was introduced and efficient lighting was installed. The total investment was EUR 900 000, with guaranteed energy savings of 35%.

- In **Karlovac County** in **Croatia**, the Eugen Kvaternik primary school was renovated under a 12 year contract. Overall, EUR 309 000 was invested to switch the heating system from oil to biomass, insulate the building envelope and modernise the lighting system. Not only did these measures achieve guaranteed savings of 53%, but also the indoor climate has improved significantly making it more convenient for teachers and pupils to be in school.

- In **Germany**, Postbank retrofitted various large-scale administrative properties ranging from 26 000 m² to 125 000 m² and located throughout the country. The objective was to achieve a holistic energetic renewal of the office buildings with limited internal investments. This was achieved with 8 year EnPC that included the exchange of existing luminaires with LED modules and the retrofitting of the buildings. Depending on the initial state of the buildings, guaranteed savings of 35-70% could be achieved with a total investment of EUR 1,9 million.

The EESI 2020 project also developed a database of EnPC good practices targeted both at facilitators (consultants, energy agencies etc.) and final customers (i. e. predominantly decision makers and officials of public administrations/city governments). It provides a single point of access to high quality EnPC references, training material to implement an energy performance contract, template contracts, and marketing information.

- ***Supporting the development of EnPC for street lighting***

The region of Upper **Austria** has implemented a plan of lighting refurbishment for public lighting in order to lower its CO_2 emissions and reach its goal, which is to supply 100 % of space heat and electricity with renewable energy sources by 2030. The region is supported by an Intelligent Energy Europe financed project, *STREETLIGHT EnPC*[42], which creates demand and supply for Energy Performance Contracting projects not only in Upper Austria but in 8 other European regions by providing regional EnPC facilitation services. These services support municipalities and (potential) ESCOs in developing projects with this innovative financing mechanism.

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40 The facilitator concept is detailed at length in Bleyl et al., IEA DSM Task XVI, 'ESCo market development: A role for Facilitators to play', ECEEE 2013

41 http://eesi2020.eu

42 http://www.streetlight-epc.eu/

Thanks to the *STREETLIGHT EnPC*, nine projects were implemented so far. They were realised by 6 different ESCOs, including 3 new ESCOs that were supported by the facilitation service in developing this new business field. Of the 9 projects, 6 were street lighting projects, 3 were indoor lighting of halls. Together, these 9 projects achieve an annual reduction of electricity consumption of 700 000 kWh and reduce electricity and maintenance costs by about EUR 170 000 per year. The total investment made in the context of these projects was EUR 2,3 million of which EUR 900 000 was financed through the electricity and maintenance cost savings (regional and national funding programmes as well as building owners' own capital made up the rest). Modernising public lighting with EnPC contributes to climate protection, saves public budgets and improves public infrastructure while increaseing safety and well-being of citizens.

- ***EnPC Plus: assistance to help SMEs develop new business models***

The *EnPC PLUS* project[43] aims to develop and promote new business models for the implementation of energy efficiency services through cooperation between SMEs, by setting-up SME Partnerships for Innovative Energy Services (SPINs) in 11 countries. This aims to reduce transaction costs of energy service packages so that smaller investments and projects in SMEs become possible for companies offering energy services. 3 types of SPINs have been defined: simple, complex and complicated, depending on the strength of the relationships between the key actors (coordinator and partners) and the maturity of the market. The project includes the definition of highly standardised energy service packages that can be easily implemented by the SPINs. At least one pilot project will be implemented in each partner country. An EU Energy efficiency network[44] has been set-up, seen as an international "market place" where the members can safely exchange valuable know-how and develop EnPC-models and SPIN-concepts.

7.2.2 Key role of project development assistance for aggregation of small scale projects into investible packages.

Project Development Assistance has been proven useful in aggregating small projects at a city or regional level. This aggregation has promoted the use of EnPC by reducing transaction costs and by making the contracts less risky for EnPC providers: a failure by a project may be balanced by better results on the other buildings, so that the overall contractual targets are respected.

An ESCO is indeed in a better position to finance investments on a pool of projects. 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 more clearly identified. This type of financial structure can only be implemented above a certain threshold, and may reduce the cost of an EnPC by diminishing transaction costs, providing more affordable financing, and reducing the risk margins which the ESCO needs to take[45].

- The **province of Teramo** (Italy) has mobilised 32 municipalities in order to procure jointly energy performance contracts (EnPC) on their street lighting facilities, thanks to support from ELENA. The municipalities get lower bills with a guaranteed level of savings, and retrofitted street lights. Street lighting management contracts are currently being awarded in 3 lots, representing a total of around EUR 150 million over up to 24 years, of which EUR 20 million will be invested in energy efficiency and renewables.

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43 http://epcplus.org/

44 http://www.energyefficiencynetwork.eu/

45 Adapted from Bullier, A., Milin, C., Alternative financing schemes for energy efficiency in buildings, ECEEE 2013; www.managenergy.net/lib/documents/868/original_3-221-13_Bullier_-_Alternative_financing.pdf

- The municipality of **Bratislava** has received an ELENA contribution to develop and implement an ambitious energy efficiency programme which aims at improving the energy efficiency of their public buildings and lighting systems using an Energy Performance Contracting (EnPC) approach. ESCO companies will therefore carry out the renovation work, provide the bulk of project financing, maintain the facilities and guarantee the contractually agreed level of savings over the duration of the contract. The programme is ambitious in terms of scale and level of expected energy performance. The ELENA assistance will contribute substantially to the implementation of this investment programme by bringing in missing resources and expertise and by strengthening the city capacities in the area of utilisation of ESCO services and EnPC. Overall, the project should trigger EUR 66 million of investments, 34 GWh/y of energy savings and 5 GW/y of RES production with an ELENA funding of less than EUR 1,4 million.

- The city of **Paris** received in December 2010 a grant of EUR 1.3 million from the ELENA programme to help them prepare and implement the refurbishment of 300 schools. This project was implemented within the framework of the Climate Action Plan for the City of Paris, through which the city has committed itself to reduce by 30 % the level of energy consumption and CO_2 emissions of its public buildings (including 600 schools) by 2020. The EU grant for project development assistance was intended to cover all the activities necessary for the preparation and implementation of the investment programme including the preparation of energy performance contracts, the preparation of energy base lines, the development of tendering procedures or the monitoring of the signed contracts. As a result, EUR 73 million of sustainable energy investments have been triggered, 45 schools were renovated in 2012 and 55 in 2013. In addition, tendering procedures for the renovation of 140 additional schools have been launched in 2015.

- The City of **Ljubljana** received an ELENA contribution in 2013 to develop and implement an ambitious energy efficiency programme which aims at improving the energy efficiency of their public buildings using an Energy Performance Contracting (EnPC) approach. In this model, ESCO companies implement the energy efficiency measures and provide third party financing. Thanks to the ELENA contribution, a special project implementation unit has been formed which is working on e.g. simplified energy audits, energy baseline checks, preparation of tender documentation, EnPC contracts, legal and financial advice. The programme is ambitious in terms of scale and level of expected energy performance. As such, it has a high market replication potential and it will contribute to the development of the EnPC market in Slovenia. Overall, the project is expected to trigger up to EUR 50 million of investments, 79 GWh/y of energy savings and CO_2 reduction of 24 500 tonnes per year, with an ELENA funding of EUR 1,3 million.

- Within the IEE Mobilising Local Energy Investment programme[46] **Cambridgeshire County** Council successfully overcame a wide spread barrier amongst public authorities which is the inability to borrow money for energy efficiency investments - even if payback times are short and the investment would generate significant cost reductions on the public purse over the long-term. The county council developed an innovative Managed Service Arrangement to provide Energy Performance Contracting (EnPC) services for schools as an off-balance sheet solution. This works through Cambridgeshire County Council contracting directly with the energy services company, then offering a Managed Service Arrangement ('back-to-back contract') with the school. More than 20 schools have signed up to the scheme leading to an investment of EUR 20 million into energy efficiency and renewable energy measures installed and reducing energy consumption by 3 828 MWh per year.

[46] www.cambridgeshire.gov.uk/MLEI

In addition, Cambridgeshire County Council set up a long-term structure to boost financing for sustainable energy projects in the county. The county council established an Energy Investment Unit (EIU) that identified and built a project pipeline, whilst at the same time securing political commitment for setting up a local authority fund of EUR 28 million. As a result, the council succeeded in signing a construction contract of the value of EUR 13 million for a 12MW solar farm to service nearly 3 000 homes with electricity and generate significant revenue for the council and it continues to build the project pipeline for the EnPC services to schools.

The **City of Padova** comprises a large number of condominiums (private multifamily buildings). In order to address this large energy savings potential, the municipality and its partner have engaged with many condominiums in order to mobilise a critical mass of demand for energy efficiency investments under the PADOV FIT! project[47]. The municipality has then procured a private ESCO whose role will be to sign energy performance contracts with the condominiums. The ESCO was selected to finance and deliver at least EUR 15 million of energy efficiency investments, thus allowing households to improve comfort and save on their energy bills.

- **A framework contract** to simplify EnPC procurement: **the London RE:FIT programme**[48]**.**

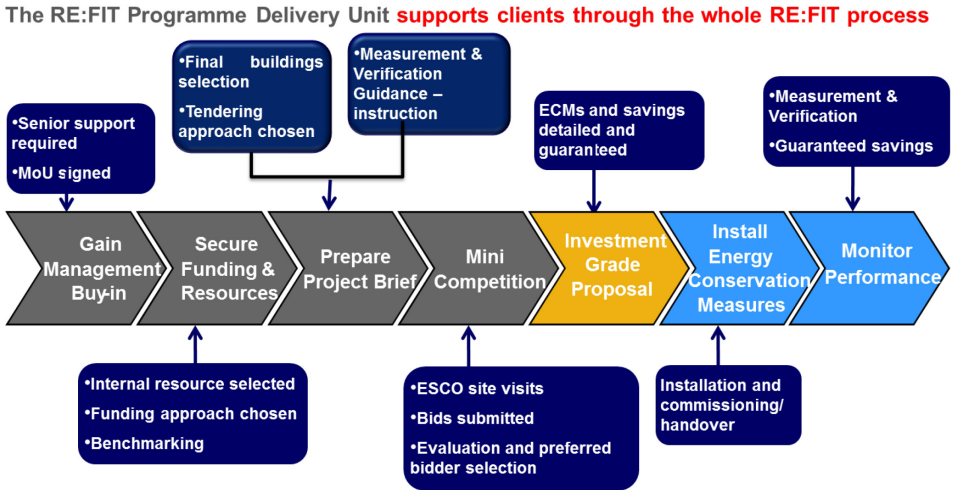
  RE:FIT is one of the pillars of the Mayor of **London**'s strategic approach to climate mitigation. It is designed to help public sector and charitable organisations achieve substantial financial savings, improve the energy performance of their buildings and reduce their CO_2 footprint based on the principle of Energy Performance Contracting (EnPC).

  Supported under the ELENA programme, this initiative has succeeded to streamline the procurement process for EnPC by providing pre-negotiated, EU-regulation-compliant contracts that can be used with a group of pre-qualified ESCOs for the design and implementation of energy conservation measures.

47 http://www.padovafit.it

48 This section is mostly adapted from: Lieven Vanstraelen, Jean-Francois Marchand and Miguel Casas, "Increasing capacities in Cities for innovating financing in energy efficiency. A review of local authority innovative large scale retrofit financing and operational models, 2015; www.citynvest.eu/content/review-local-authority-innovative-large-scale-retrofit-financing-and-operational-models

Figure 66: key steps in the RE:FIT process[49]



Source : RE:FIT

The *RE:FIT London* programme has already achieved significant results: 619 buildings have been refurbished representing a total investment value of GBP 93 million, GBP 6,9 million of cost savings (each year from lower fuel bills) and 119 kt of CO_2 saved.

In the summer of 2013 the Greater London Authority launched a specific *RE:FIT* School programme targeted to address energy efficiency in schools. The programme is supported by the Salix energy efficiency loan scheme, which provides 100% interest-free capital for the public sector to reduce their energy costs by enabling the installation of modern, energy efficient technologies and replacing dated, inefficient technologies.

Since 2016 the RE:FIT programme has been extended to other parts of **the UK** such as **Wales**.

7.2.3 Innovative financing schemes for energy efficiency

- The *Citynvest*[50] project has analysed 24 case studies across Europe where local authorities have developed a specific set of arrangements to deliver investments in building renovation, usually financed through private investors. A report provides detailed information on each scheme and a cross-cutting analysis of all schemes.

[49] Source: Camilla Allwood, Tristan Oliver, Brussels 28 April 2015 http://www.managenergy.net/lib/documents/1378/original_REFIT_-_T._Oliver_and_C._Allwood.pdf?1431080314

[50] Lieven Vanstraelen, Jean-Francois Marchand and Miguel Casas, "Increasing capacities in Cities for innovating financing in energy efficiency. A review of local authority innovative large scale retrofit financing and operational models, 2015; www.citynvest.eu/content/review-local-authority-innovative-large-scale-retrofit-financing-and-operational-models

Figure 67: overview of different models to deliver energy efficiency investments

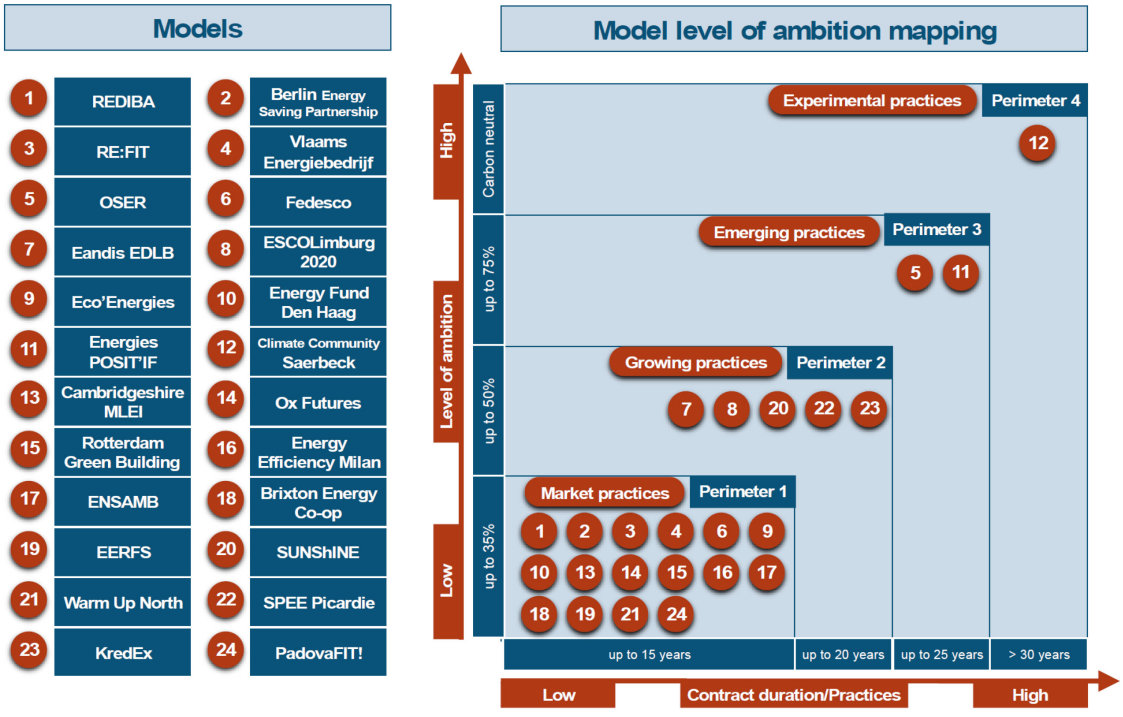
Model positioning synthesis

	Facilitation model		Integration model		Financing only model
	Without aggregation	With aggregation	Without aggregation	With aggregation	
FI financing (*)	REDIBA Eco'Energies EERFS	Berlin ESP RE:FIT Vlaams energiebedrijf ENSAMB Energie POSIT'IF	Warm Up North	-	N/A
ESCO financing	REDIBA Eco'Energies EERFS	Berlin ESP RE:FIT Vlaams energiebedrijf Rotterdam GB EE Milan PadovaFIT!	-	-	N/A
PDU financing (**)	OSER	Fedesco Ox Futures	OSER	Fedesco Energie POSIT'IF Eandis EDLB EscoLimburg 2020 SPEE Picardie	N/A
Investment fund	EERFS SUNSHiNE	-	-	EscoLimburg 2020 Cambridgeshire MLEI	Energy Fund Den Haag KredEx
Citizens financing	-	OxFutures Brixton Energy Co-op	-	-	Saerbeck

(*) FI financing = Financial Institutions financing
(**) PDU financing = Program Delivery Unit (PDU) financing

Source: Citynvest

Figure 68: An overview of the schemes and the level of energy savings they aim to deliver.



Source: Cityinvest

- *'One-stop shop' approach for home renovation (Denmark)*

Better Home is a new scheme started in 2014 by the **Danish** Energy Agency. Its aim is to facilitate energetic renovation for homeowners. **Denmark** wants to create a "one stop shop" for energy renovation for private home owners, where the owner only has to contact one certified building contractor to get counselling on energy renovation of the entire building. The Agency educates/trains and approves professionals such as architects, engineers, craftsmen, energy consultants and building designers and advisors on energy renovation in private homes. A Better Home advisor can manage the process and can follow the project all the way from plan to completed renovation. The advisors can give homeowners the reassurance they lack today to engage in a major renovation project. There are educated Better Home advisers all over the country, but not yet in every municipality.

The purpose of the Better Home programme is to ensure that homeowners get the most out of their investments. The energy savings can help pay for the home improvements. This requires that the homeowner gets an overview of the entire house, i.e., climate shield as the roof and exterior walls as well as installations, such as heat pumps.

- *Energie Posit'If (France)*

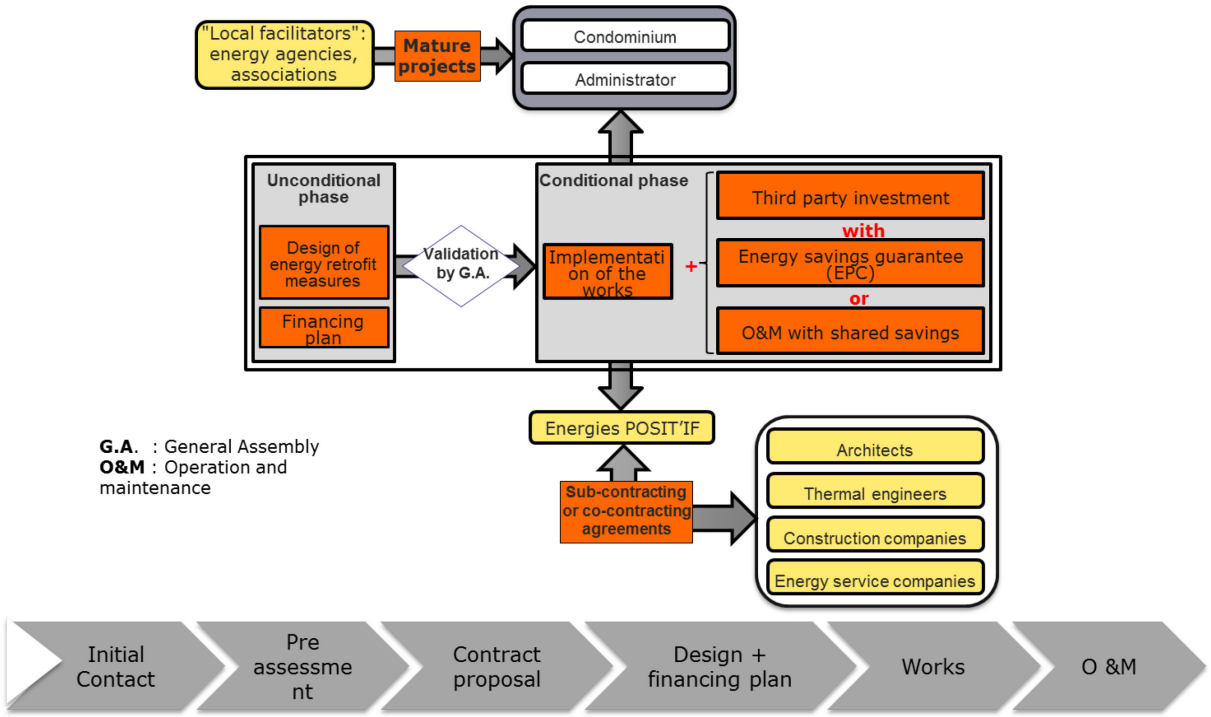
Île-de-France, the region around **Paris**, has set itself an ambitious target of reducing energy consumption in buildings by 38% in 2020. Residential buildings represent the lion's share of the savings potential, in particular the 1 million private apartments in multifamily buildings, which are lagging behind in terms of energy efficiency. Energy retrofits are very difficult to implement due to a number of factors such as the lack of capacity among homeowner associations, the lengthy and difficult collective decision-making procedures; and the high level of indebtedness of many homeowners, due to the increase of housing prices over the past 20 years[51], which often prevents taking additional loans.

The **Ile de France** Region therefore created its own ESCO called *Energies POSIT'IF*[52], which aims to develop, implement, monitor and finance deep renovations in large condominiums. It operates as a semi-public company under market rules. *Energies POSIT'IF* assists homeowner associations in the definition of the deep renovation measures and the financing plan for each homeowner. If this is validated, *Energies POSIT'IF* provides a comprehensive service offer which includes the delivery of the works, guaranteed energy savings, and the provision of finance for homeowners who need it. *Energies POSIT'IF* subcontracts the design, works and operation and maintenance activities and acts as an assembler.

[51] The average price for homes was multiplied by 2.5 between 1996 and 2016 (source: INSEE)

[52] http://www.energiespositif.fr ; the development of the project pipeline is co-funded by the Intelligent Energy Europe (IEE) programme under the MLEI PDA initiative.

Figure 69: Energies Posit'If



Source: José Lopez, Energies POSIT'IF

The provision of finance is a cornerstone of the *Energies POSIT'IF* concept, but it faced major legal obstacles. For instance, according to the previous French law, Energies Posit'If had to comply to the full prudential rules imposed on banks as they are making credit operations. Finally, the French Energy Transition law adopted in summer 2015 provides an exceptional regime for public third party financing companies, and enables *Energies POSIT'IF* to provide finance to homeowners with a specific status.

Besides, *Energies POSIT'IF* faced a major challenge in access finance at affordable cost as they didn't have any track record, and they were considered as a risky client by banks. The shareholders (Region or local authorities) were also not allowed to provide a guarantee in case of default, as that would be considered an unjustified State aid under EU regulations. The solution finally came in December from the European Fund for Strategic Investments (EFSI), which gave a guarantee for a credit line of EUR 100 million with the European Investment Bank (EIB). ***Energies POSIT'IF* was thus one of the first projects validated under EFSI**, along with **Picardie** *Pass Renovation*.

Four years after *Energies POSIT'IF* was created, renovation work is ongoing in four condominiums made up of 1 500 apartments and an investment value of EUR 20 million, which so far is only financed through grants and bank loans. Another 60 contracts are already in the pipeline.

- ***Picardie Pass Rénovation (France) - deep renovation of detached houses (France)***

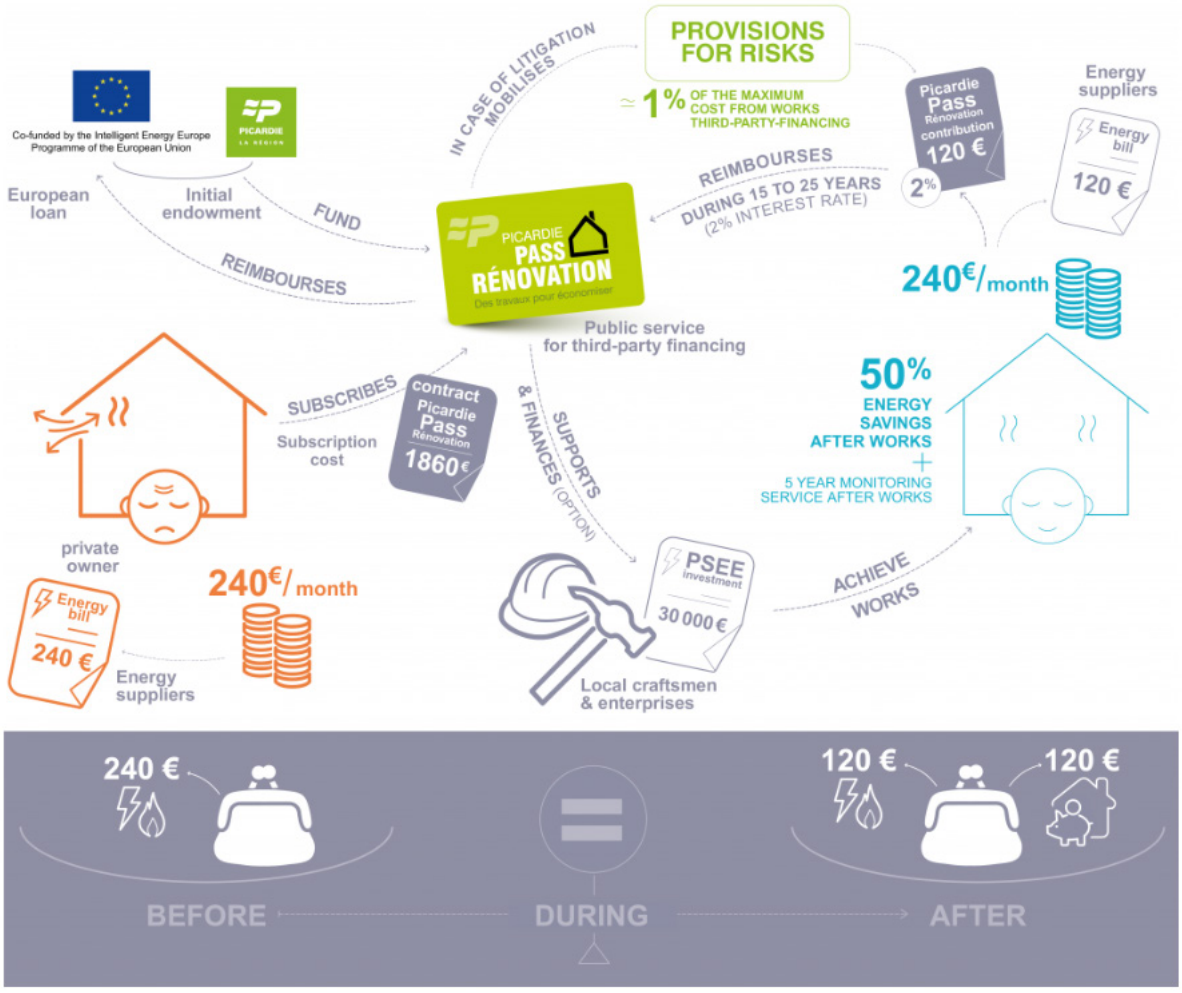
The **Picardie region** (France) has launched a **Public Service for Energy Efficiency (PSEE)** called 'Picardie Pass Rénovation' programme, which aims to implement large-scale deep renovation of detached housing, the predominant building type in the region.

Supported under the EU funded ELENA programme, this regional entity assists homeowners in the implementation of energy efficiency measures by acting as a one-stop-shop from the start with initial advice, further on an energy audit, defining the optimal set of energy efficiency measures, contracting and overseeing the works, providing long term funding and monitoring the results of the project during five years.

The project is based on a multi-stakeholders partnership approach, which involves local governments and construction companies. The proposed third-party funding mechanism provides an alternative to the traditional banking system. The programme can lend money to the homeowner based on the future energy cost savings, which banks normally refuse to take as a collateral.

Their main objective is to renovate 2 000 private housing units in the test phase and 10 000 per year as of mid-2018. The average loan includes 30 000 EUR for energy efficiency measures and the average monthly reimbursement for householders is around 150 EUR/month during 25 years. In order to generate mass demand for energy renovation in individual housing in Picardie and take up one of the challenges in climate change, the Picardie Pass renovation received a framework loan amounting to EUR 23.5 million from the European Fund for Strategic Investment, which should mobilised EUR 58 million.

Figure 70: Picardie Pass' Rénovation



Source: http://www.pass-renovation.picardie.fr/project-funded-by-europe/

A similar programme is being developed in the **Alsace region** ('Oktave') with support from the Intelligent Energy Europe programme.

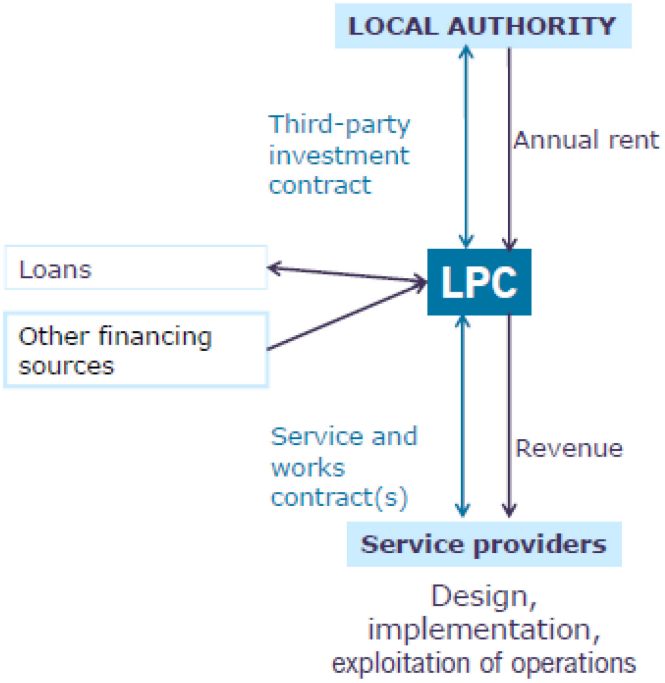
- ***OSER, a public ESCO for deep renovation of public buildings (France)***

The **Rhône-Alpes region** has set itself a goal to reduce the energy consumption of public buildings by 40 to 75%. However, small municipalities lack the capacity to develop these projects and need to be assisted. Energy performance contracting (EnPC) is a powerful mechanism to deliver projects, but

ESCOs are not willing to finance the investments required for deep renovation, due to the amounts involved and the long tenor of the debt. There is a clear market failure when it comes to financing deep renovation EnPC. The Region therefore created its own public ESCO, called OSER[53], together with 10 municipalities. OSER is an in-house ESCO acting for its member public authorities.

OSER assists public authorities in designing energy performance contracts for deep renovation. OSER takes care of the initial audits and specifications of the works (including non energy related works). It then procures an ESCO which will design and implement the works and guarantee the savings over the lifetime of the contract (usually 20 years). OSER signs an EnPC with the public building owner, and signs a back-to-back contract with the ESCO, so that all obligations are passed on.

Figure 71: The OSER scheme[54] (LPC refers to OSER)



OSER takes care of financing the investments upfront, thanks to a construction finance loan issues by the European Energy Efficiency Fund. Once the works are delivered, OSER sells the future receivables of the contract to financial institutions; a practice which is very common to finance public authority contracts ('cession Dailly') and not based on the future energy savings. The investments are therefore fully consolidated in the debt of public authorities.

OSER is currently working on 9 public building renovation projects, and plans on investments between EUR 15 and 20 million per year.

7.2.4 Capacity building and stakeholder dialogue

In addition to the development of projects and financing schemes, an essential component to increase energy efficiency investment is to build the capacity of stakeholders across the value chain on energy efficiency finance. Energy efficiency experts, policy makers, building owners, financiers,

53 http://spl-oser.fr

54 Regis Pouyet, Rhône Alpes region, 8 October 2014, http://managenergy.net/lib/documents/1218/original_Pr%C3%A9sentation_Bruxelles_081014_VA_OSER.pdf?1412843690

and consumers do not speak the same language when it comes to financing a project or a programme. An increasing number of initiatives are taking place across Europe to build capacity.

- In the **Infinite Solutions** project[55], 9 cities across Europe are creating home renovation loans and intracting[56] schemes based on the successful examples of Delft and Stuttgart, who are delivering training to those cities. A complete set of training materials is developed and the project will be training future trainers in 2016, in order to roll-out the results of the project across Europe. Similarly, the *Citynvest* project[57] is delivering 9 workshops across Europe to present the different types of programmes that local and regional authorities can develop to foster energy efficiency investments in buildings. The *ManagEnergy* initiative delivered 45 regional workshops across the EU between 2012 and 2015, many of which focused on financing energy efficiency and energy performance contracting. Despite these initiatives, capacity still needs to be increased.

- Other initiatives focus on organising dialogue between stakeholders, such as the **Energy Efficiency Financial Institutions Group[58] (EEFIG)**, which was initiated in 2013 by the European Commission and the UNEP Finance Initiative as a discussion platform. The EEFIG report published in 2015 provides useful input to EU policies, and the 120 participants of the group have considerably increased their mutual understanding.

  The EEFIG approach attracted a lot of interest and is currently being replicated at a global level by the G20's Energy Efficiency Finance Task Force. At the national level, also supported by the European Climate Foundation, **similar working groups were initiated so far in Germany, France and Bulgaria** delivering analyses and recommendations specific to their national context. Over the period 2016-2019, the European Commission will be implementing events in 15 Member States aiming to kick-start national discussion platforms on sustainable energy finance on the one hand, and to build capacity of national stakeholders in terms of project / programme development[59].

- The **Sustainable Energy Financing Platform for Austria (SEFIPA)** kicked-off in 2016 and aims to organize dialogue with the national stakeholders in order to develop new financing solutions for energy efficiency and renewable energy; it will also develop a crowdfunding platform for renewable energy projects.

- In **Spain**, the *ENERINVEST* project started in 2016 and will be promoting all information available on successful innovative financing models for energy efficiency, engaging in a dialogue with all stakeholders in order to improve legislative frameworks, and create an electronic platform which will allow the assessment the market potential for a specific financing scheme.

7.3. De-risking energy efficiency – creating the market

Project promoters and financiers often see energy efficiency investments as risky, because their results, risks and benefits are not fully known. Projects are technically very diverse and financial institutions do not have the technical expertise to process them in accordance with their normal due diligence requirements, in particular for smaller investments. Another key issue is the lack of a track record accepted by the financial community, which would provide statistical data regarding the

55 http://www.energy-cities.eu/spip.php?page=infinitesolutions_en

56 "Intracting" is like an internal EnPC, where all operations are done with the city administration and with operational accounts.

57 http://www.citynvest.eu

58 www.eefig.eu

59 Sustainable Energy Investment Forums initiative, starting in September 2016.

certainty of energy savings actually taking place and predictable default rates; this could in turn allow financiers to count those savings as revenue and ease access to finance for projects.

De-risking energy efficiency means developing standardised and commonly accepted frameworks which would give the financial sector and investors enough confidence in the quality of projects and their financial performance. In other words, energy efficiency investment cycle needs to be standardised so that both supply and demand side of finance know what to expect, based on hard data.

Finally, it is necessary to create benchmarks and indicators for institutional investors which will allow them to prioritise assets with higher sustainability (low-carbon) scoring derived from energy efficiency and renewable energy investments.

7.3.1 Standardisation of energy efficiency increases investors' confidence

Standardisation is needed to simplify the due diligence processes of financial institutions, asset managers and investors, which is essential to ensure that they manage properly the money or assets entrusted to them. Due diligence is an investigation of a potential investment, which serves to confirm all material facts in regards to a contract. In the absence of standards, project developers provide very different types of information, which financiers are not able to analyse quickly in a uniform manner. The same project can be presented in very different ways depending on the technical standards which were used; this creates confusion for financiers and a lack of trust on the expected outcomes of the investment, i.e. a steady cash flow in the form of energy savings.

- ***Trust EnPC South***

The Trust EnPC South project[60] aims to increase the confidence of the finance sector in energy performance contracts by developing a certification for energy performance contracting projects for private tertiary buildings in Southern Europe. The certification to be developed will be an extension of the existing Green Rating methodology, developed by Bureau Veritas for existing commercial buildings. Green rating scores the environmental performance of a building and the improvement potential on energy, carbon, waste, water, health and transportation. The “Trust ENPC” label will be a proof of quality of the ESCO's project, certified by a recognised organisation such as Bureau Veritas. It will give financial institutions confidence that the energy savings forecast by the ESCO are realistic and can be delivered without risk; this will allow financial institutions to reduce the effort required to understand and evaluate the risk of a project, which in turn should allow better access to and cheaper financing.

- ***Investor Confidence Project Europe***

In collaboration with industry stakeholders and with support from Horizon 2020, the *Investor Confidence Project Europe*[61] has developed its ICP Europe Protocols to define European best practices for predicting energy savings, optimising performance, and monitoring the results of energy efficiency investments. The protocols don't create new standards but list the technical standards which need to be applied to ensure that a project is of good quality. The concept of ICP was initially developed in the USA, where it is progressively becoming a reference for investors and a series of State or regional programmes are adopting it. The ICP protocols enable the acceleration of energy efficiency investments and the emergence of a robust and thriving commercial renovation sector by increasing confidence in the engineering fundamentals and financial returns of projects.

ICP Europe’s Investor Network was developed to help address the needs of investors looking for

60 http://www.trustepc.eu/en

61 http://europe.eeperformance.org

standardised projects that reduce the time, risk, and costs involved in funding energy efficiency building retrofits. At its launch in 2016, it brings together investors with over EUR 1 billion available for energy efficiency retrofit projects, and comprises a wide range of energy efficiency financiers who recognise the value of standardised, investor-ready projects to increase deal flow and drive demand in the marketplace. As a result, some of the members offer developers incentives such as accelerated underwriting, reduced transaction fees, and preferable terms for certified projects.

- ***Simplifying the assessment of small-scale projects***

The *SEAF project*[62] ("Sustainable Energy Asset Evaluation and Optimisation Framework") intends to enhance investors' confidence in sustainable energy and, in particular, energy efficiency projects and thus to facilitate access to finance. It develops an IT-based platform to standardise the valuation and benchmarking of small-sized sustainable energy projects (energy efficiency, demand response, distributed renewable energy generation, electricity storage).

Joule Assets, the project promoter, has developed and applies sustainable energy asset valuation tools and procedures, which are being refined and complemented by two other tools:

- standardised energy performance protocols based on the Investor Confidence Project, available for each country in the EU, which will be used to simplify due diligence processes;

- a risk assessment and optimization component: insurer HSB fine-tunes and integrates its risk assessment tool in the project context and offers corresponding insurance solutions, thereby enhancing the risk profile for investors.

Overall, SEAF streamlines the communication and valuation process, overcomes/reduces (perceived) market complexity (e.g. by providing a "one-stop-shop" solution) and, thereby, increases investor's trust and confidence in sustainable energy investments.

- ***Green mortgages by ASN Bank (Netherlands)***

ASN Bank introduced in 2002 the first green mortgage product in the Netherlands[63]. It included an Energy Performance Assessment, paid for by the ASN Bank, worth 200 Euro, and a 0,2% reduction in interest rate after implementation of one single energy audit recommended measure (0,3% reduction interest fee after implementation of all recommended measures).

The results were very convincing: 100% of new ASN Bank mortgage clients accepted the Energy Performance Assessment and implemented at least one recommended measure. The costs for the bank were minimal (0,2% was calculated in the pricing model) and the impact was very large, as many clients implemented more than one recommended measure. In the present circumstances, with extremely low interest rates, this product might be less successful. In order to keep administration costs low, the evidence required was minimal: no check on invoices, the rule is to trust as long as no evidence of fraud occurs.

7.3.2 Making energy efficiency attractive for institutional investors

A secondary (re-financing) market for energy efficiency investments needs to be created in order to allow investors/lenders to refinance their assets and invest their money into new projects. This is especially important in the period post-COP 21, where large institutional investors are keen to re-allocate their asset holdings in areas such as renewable energy sources or energy efficiency.

There is an increasing appetite of the financial community for investing in energy efficiency, which

62 https://www.seaf-h2020.eu/about-us/

63 http://www.duurzaam-beleggen.nl/2002/10/16/titel-117

can be seen in the different investor statements which were published in the run-up to the COP21 in December 2015. The G20 Energy Efficiency Investor Statement was signed and endorsed by 39 investors managing close to USD 4 trillion, while the Statement by Financial Institutions on Energy Efficiency was endorsed by over 100 banks and leasing companies from 42 countries[64].

Appetite for 'green' investments is growing in the finance sector, as policies are being put in place that will progressively disincentivise investments which do not contribute to the fight against climate change. The ability to finance green investments is limited by the ability for investors to identify what a green investment is, and which investments are greener than others. To this end, more clear guidelines on what is 'green' are essential for investors and for the market that recommend transparency and disclosure to promote integrity in the development of the green investment market.

In the case of energy efficiency, this is more difficult as dedicated financial products are rather marginal and energy efficiency is usually integrated in larger investments. The green bond market has been growing tremendously over the past years, but its energy efficiency content is still very slim and mostly focused on new buildings. When it comes to equity investments in companies, there is no clear data that would allow investors to modify their asset allocation towards energy efficiency.

- ***Sustainable Energy Investment Metrics for financial markets***

The *SEI Metrics* project (funded under Horizon 2020) is developing a framework to assess the climate performance of institutional investors' portfolios, i.e. their alignment with the investments that are required to keep global warming under 2°C. This will allow investors to benchmark themselves, and to set targets for the reallocation of assets to low(er) carbon investments. The first version of this benchmarking framework[65] was released in November 2015. Demand from the financial sector is proving much higher than expected, which reflects the dynamics launched around COP 21 in the financial sector. *SEI Metrics* now has 70 investors testing the 2°C portfolio methodology and is in discussion with index providers to include it in the selection of projects.

- ***Incorporating energy transition in mainstream risk models***

In complement to *SEI Metrics*, the *ET RISK* project (funded under Horizon 2020) is developing a methodology to assess the risks and opportunities associated to an Energy Transition scenario for institutional investors in the bond and equity markets. This methodology should contribute to the reallocation of assets as energy efficiency and renewables present a lower energy transition risk. The project will then develop equity valuation models and credit risk models, which will be integrated into the products of mainstream service providers such as Standard & Poor's. This answers a clear need of financial regulators, as the European Systemic Risk Board published in February 2016 a report calling for climatic stress tests on financial firms[66].

At the international level, *SEI Metrics* and *ET RISK* come at a very timely moment. In January 2016, the G20's Financial Stability Board nominated a Task Force on Climate-related Financial Disclosures, led by Michael Bloomberg. This task force is expected to give guidelines for the implementation of the new **French** law on the disclosure of climate impact of institutional investors, and how to integrate climate risk in asset valuation. The research on climate metrics and their integration into policies is providing input for the drafting of new policies.

64 http://www.unepfi.org/fileadmin/documents/EnergyEfficiencyFinanceStatement.pdf
65 http://2degrees-investing.org/IMG/pdf/2dportfolio_v0_small.pdf
66 https://www.esrb.europa.eu/pub/pdf/asc/Reports_ASC_6_1602.pdf

7.3.4 Refinancing energy efficiency assets

Refinancing is a key mechanism in the financial sector; it allows a financial institution to transfer to another entity the claim they have on a client or on a project, in order to free their balance sheet and be able to finance further projects. Refinancing consists of assigning a contract or a claim against a cash payment representing the future cash flows. The most common procedure for energy efficiency projects is 'forfeiting' on energy performance contracts, whereby the future energy savings are assigned by the ESCO to a financial institutions, as developed below.

However, due diligence costs for such operations are rather high and not adapted for small investments, which need to be aggregated and sold in the form of a security. Such securities can be sold over the counter (i.e. on a bilateral basis without publicity) or through a public operation, the most popular of which is the issuance of a bond. A bond allows reaching directly the debt capital markets, and avoiding the constraints imposed by financial regulations.

- *Refinancing ESCOs for public building renovation (Bulgaria)*[67]

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 EnPC 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 EnPCs (the energy savings). Thanks to loans from the EBRD (EUR 7 million initial loan followed by EUR 10 million 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 of 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 buy future receivables from EnPCs (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 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.

- *Forfeiting fund in Latvia*

In **Latvia**, the *SUNSHINE* project[68] is currently exploring options to create a similar forfeiting fund which would refinance ESCOs working on multifamily buildings. As an illustrative example, RenEsco[69] has implemented energy performance contracts on approximately 15 buildings in Latvia, with energy savings of 50 to 60% guaranteed for 20 years. The savings have been achieved and the ESCO now has a good track record, but it has mobilised all its equity (along with bank loans) and cannot finance any

[67] Quoted from Bullier, A., Milin, C., Alternative financing schemes for energy efficiency in buildings, ECEEE 2013; www.managenergy.net/lib/documents/868/original_3-221-13_Bullier_-_Alternative_financing.pdf

[68] http://www.sharex.lv/en/project-overview

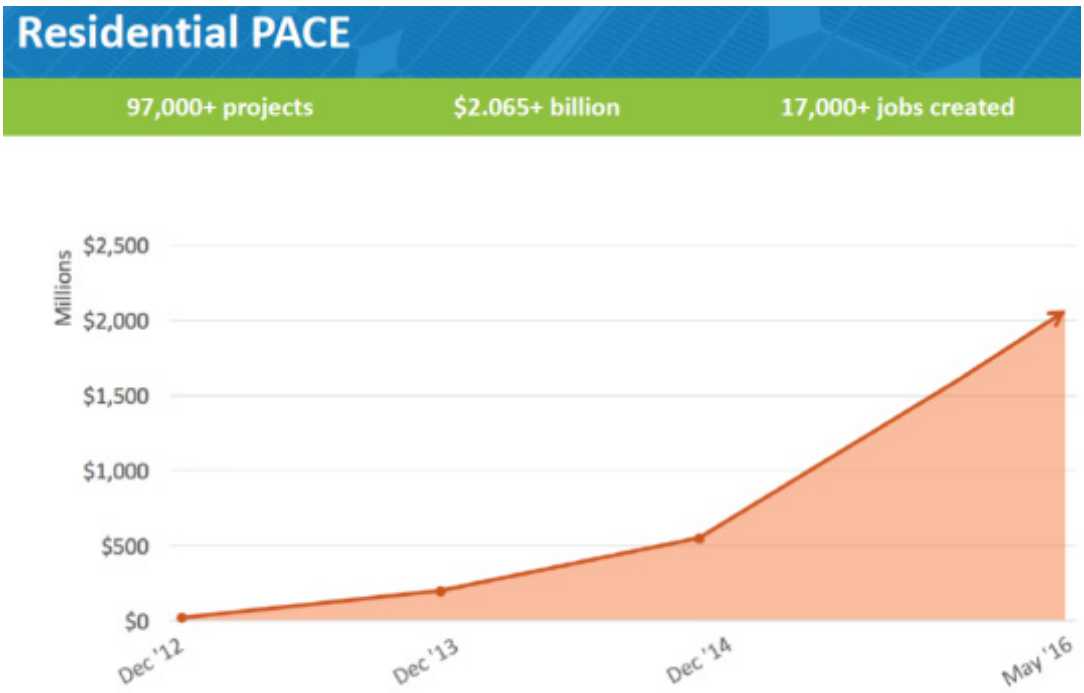
[69] www.renesco.lv; RenEsco won the European Energy Services Award in 2012 for developing EnPC for deep renovation on multifamily buildings

additional projects. A forfeiting fund would thus allow RenEsco to off-load its balance sheet and invest equity in new projects; it would also allow new ESCOs to develop, by providing them with a medium-term financing solution.

- ***PACE bonds: securitisation of home renovation loans (USA)***

Property Assessed Clean Energy (PACE) is a system which allows attaching a debt to a property so that the debt service is collected through the property tax bill. PACE was created in 2008 in Berkeley, California, and has since spread over the US, first on commercial and more recently on residential buildings. In the commercial sector, over USD 250 million have been invested so far on more than 750 large buildings. In the residential sector[70], over USD 2 billion have been financed on more than 97 000 homes, with an exponential uptake since 2015 when USD 1 billion was issued in loans.

Figure 72: Uptake of PACE investments in the residential sector



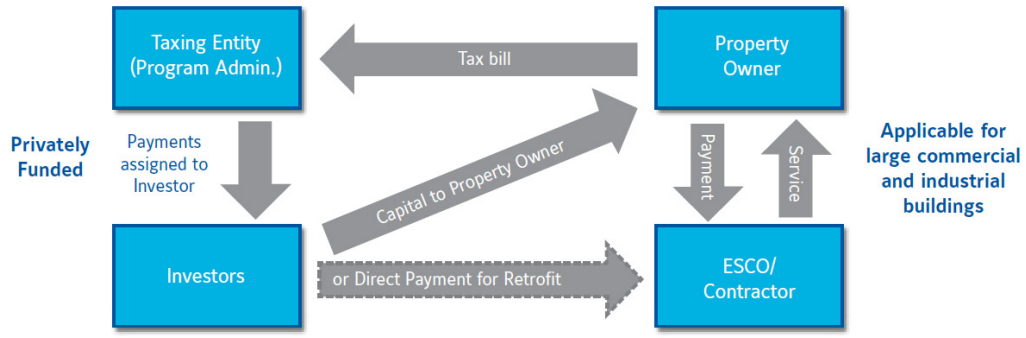
Source: PACE Nation

A PACE programme can be put in place by passing PACE-enabling legislation at State and/or county level. A PACE administrator is hired to manage the programme, in which 1 or several investors propose funding to building owners for a list of investments which have been identified as eligible (mostly energy efficiency, renewable energy, and to some extent water saving devices).

Usually, contractors are the entry point to sell new equipment: they are trained to propose PACE finance when the client needs to repair or change equipment. If the client agrees, the loan is registered with the local authority and a regular fee is attached to the property ('property assessment'). The building owner then repays it through the property tax over the lifetime of the loan. Most contracts are financed through private capital, although sometimes public money is used to kick-start PACE (e.g. through Green Banks or municipal bonds).

[70] Residential PACE was slowed down by a 2010 decision of 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). However, residential PACE continued to develop and the issue is now being overcome.

Figure 73: Principles of a PACE programme



Source: Katrina Managan, Kristina Klimovitch, 'Setting the PACE: Financing Commercial Retrofits', Institute for Building Efficiency, 2013.

PACE has many advantages compared to traditional finance. As in an EnPC, the lack of upfront costs makes it an attractive solution for building owners. Contrary to EnPC, PACE does not guarantee the level of savings, which reduces the transaction costs related to the establishment of a baseline, contract establishment, monitoring and verification, etc. It is a purely financial contract, which is easy to establish even for small transactions in individual homes. Attaching the debt to the tax bill makes it a very secure asset, because taxes are the most senior debt (i.e. anyone has to pay their taxes before they reimburse their other debts, even if they are bankrupt). It also allows passing on the debt in case the building is sold.

Finally, successful PACE programmes deliver a large number of investments which are all based on the same contracts and same underlying assets, in particular the same low risk of payment default. It is therefore rather easy to securitise PACE loans and sell them to institutional investors. The first PACE bond was issued in 2013 and since then, the number and size of PACE bonds has been increasing steadily. On 6 June 2016, Renovate America issued their 7th PACE bond[71], which is the biggest to date at USD 300 million. Coupons were sold at 7,96%, based on 3,432 PACE assessments of 15 years with an average loan USD 24 000. Whereas 7,96% remains a high interest rate, this is due to the fact that PACE bonds are still not considered as a liquid asset with a secondary market where investor can sell the bonds when they need. However, the growth of the market should result in the development of a secondary market in the coming years, thus driving down the cost of finance for energy efficiency.

Although implemented in the specific context of the USA, PACE has been a very successful model which would deserve replication[72].

- ***Green bonds: ABN Amro's example***

In the **Netherlands**, in 2015 ABN Amro issued a covered bond to finance EUR 10 billion worth of investments in its real estate portfolio, enabling its clients to invest for energy efficiency upgrades. The financing offered covers 100% of the building's upgrade. ABM Amro is also leading by example, by investing into renovation of own buildings and has received 2016 BREAM Award for its headquarters' buildings.

The green bond policy of ABN Amro focuses on new and upgraded sustainable real estate. For the second green bond, energy efficient renovations and transformations of existing commercial real

71 www.prnewswire.com/news-releases/largest-pace-bond-securitization-completed-300280343.html

72 In France, the Picardie and Alsace regions are trying to attach debt to the property, but face complex legal obstacles

estate were included. Proceeds will be used to (re)finance loans to green real estate including recently built buildings and energy efficient upgrades. Four assets categories are eligible for the green bond:

- Mortgage loans for recently built energy efficient residential houses;
- Green loans for financing energy efficiency improvements and renewable energy measures on residential property;
- Recent commercial real estate loans for energy efficient buildings;
- Energy efficiency upgrades, renovations and/or transformations of (former) commercial real estate.

All projects have to meet clearly predefined sustainability criteria, which are verifiable by quantitative indicators. The fund flow management and the impacts are regularly monitored and reported on, as well as independently evaluated/audited.