

# Scalable Innovative Financing for Smart Buildings

October 2018



# ABOUT smartEn - SMART ENERGY EUROPE

smartEn is the association of market players driving digital and decentralised energy solutions. A successful European energy transition requires the intelligent cooperation between consumption, distribution, transmission and generation, acting as equal partners in an integrated energy system.

## OUR VISION

The digitally enabled interaction of demand and supply is an integral part of an increasingly decentralised, decarbonised energy system.

## OUR MISSION

- **Promote system efficiency** through the advanced management and integration of electricity demand and supply in homes and buildings, transportation, businesses and decentralised energy projects.
- **Empower energy users** by enabling them to participate in the energy market through flexible demand, storage, self-generation and the participation in community projects, and giving them control of their energy data.
- **Encourage innovation and diversity** by enabling new market players and service offers that provide attractive choices for consumers and allow for healthy competition.
- **Drive the decarbonisation of the energy sector** through the cost-effective integration of renewable sources and the electrification of heating, cooling and transport.



---

## TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	03
2. FROM POLICY TO IMPLEMENTATION	04
3. BRIDGING PUBLIC AND PRIVATE FINANCE	05
4. FINANCING TOOLS FOR PRACTICAL IMPLEMENTATION:	06
a. Energy Performance Contracting (EPC)	07
b. On-Tax Financing	08
c. On-Bill Programmes	09
d. Crowd Financing	10
e. Energy Efficiency Mortgages/Loans	10
5. SUMMARY AND CONCLUSIONS	11
FOOTNOTES	12
NOTES	13

# 1. EXECUTIVE SUMMARY

The built environment represents an extensive and underexploited opportunity for energy, cost and CO<sub>2</sub> savings. While buildings are responsible for the largest share of European final energy consumption (40%) and represent enormous potential for flexibility and energy savings, current investments to improve their energy performance is low and their demand-side flexibility potential remains almost entirely untapped. To achieve the ambitious energy and climate goals set by the European Union (EU), renovation rates must increase from 1 to 3% per year and the investment of an additional €100bn is required annually until 2030<sup>1</sup>.

The clean energy transition represents a key opportunity for public authorities, investors and businesses to **unlock financing for Smart Buildings** and address the needs of European citizens while driving the energy transition forward.

Without **effective and scalable financing schemes**, it is impossible to reach the volume of investment required to upgrade European buildings. To date, the financing landscape has been dominated by bank loans, subsidies and grant programmes on national, regional and local levels. While some cities and countries have successfully experimented with innovative financing models, which do not require either tax-payer's money or burden users with private debt, the uptake is still low. There is a **need for a greater awareness of innovative financing mechanisms** that best address the Smart Buildings' renovation needs while being affordable and effective for buildings' owners and users. **These models are therefore key to tripling renovation rates, without negatively impacting the financial health of European citizens or burdening public budgets.**

The benefits of Smart Buildings go beyond energy/cost reductions and direct CO<sub>2</sub> savings, but also enable flexibility capacity and an array of societal and environmental improvements. Indeed, every building can be a source of decentralised energy resources (on-site renewables, energy storage and demand response) which can be exploited by innovative service providers. Increased flexibility contributes to the grid stability, and to the balancing of energy supplies – in other words, it enhances the efficiency of the overall energy system. Plus, as people spend 90% of their time indoors, people's health, wellbeing and productivity can be boosted in more comfortable, healthy and intelligent buildings, which in turn can result in decreasing healthcare costs and increasing workplace performance. These non-energy benefits of Smart Buildings are key in addressing the real concerns of all Europeans.

However, the above-mentioned potential will remain untapped if policy will rely on a “business as usual” strategy which simply involves increasing public subsidies and higher lending volume from standard financial institutions. This will not be a sustainable strategy, given the existing constraints on public budgets and the capital requirements of the banking system.

Currently many viable and necessary renovation projects are not implemented, even those where project repayments are directly and immediately balanced by energy cost savings, because so many households and businesses do not have the capacity to finance them up front. This is particularly true in the very regions of Europe where building renovation is most urgently needed.

Much of the public discussion and support currently circle around enabling banks to engage in providing renovation loans, resulting in an **unbalanced treatment of financing sources**. Member States and the Commission should also look, with equal urgency, to reduce the barriers to innovative financing mechanisms that enable both commercial users as well as lower and middle-class consumers to finance **smart and sustainable** building investments.

This paper addresses several **innovative financing mechanisms** that have the potential to dramatically increase the volume of building renovation projects: Energy Performance Contracting (EPC), on-tax financing, on-bill programmes, crowd financing mechanisms for local projects and energy efficiency mortgages. These mechanisms, provided by funds, banks or through crowd financing, have proven highly successful at creating a stable pipeline of projects internationally and much more can be done, if adequately supported by European and national policies.

## 2. FROM POLICY TO IMPLEMENTATION

As Member States are preparing for the implementation of the revised Energy Performance of Buildings Directive (EPBD) and beginning to develop **national renovation roadmaps** for their entire building stock, this paper offers a set of effective private financing solutions to help national policy-makers to reach their climate and energy goals.

This is an opportunity to drive the renovation and digital upgrade of their building stock: national renovation roadmaps should foresee the **broad installation of smart and sustainable solutions in buildings to unlock the potential of active energy efficiency measures, complementary to passive ones, and to enable demand-side flexibility.**

### Financing must be at the centre of the building renovation revolution.

Private financing schemes for active energy efficiency and demand-side flexibility solutions in buildings are already a thriving reality and their high cost-effectiveness drives attractive risk-adjusted returns. However, very few programmes are able to reach sufficient scale and generate a critical mass of projects to become attractive to large private and institutional investors. The reasons are multiple; some have to do with policy and others with financial instrument deployment. On the policy side, there is a general lack of communication and awareness about innovative financing instruments, resulting in a limited understanding of these instruments also among public authorities.

On the deployment side, there is a need for a stronger focus on demand generation, technical assistance and standardisation as outlined below:

### Smart Buildings should be the aim of each renovation

The automation update of buildings enables occupants to reduce their energy consumption and cut their energy bills while empowering consumers to participate in electricity markets and thus even allowing them to earn money from the demand-side flexibility of their Smart Buildings.

In fact, in a Smart Building, electric heaters, air conditioners, water boilers, batteries and other electric devices are connected and, through automated demand-side management services, shift the electricity consumption of certain appliances to better respond to the needs of the electricity system and occupant. In addition, by bundling multiple customer loads from individual smart buildings to respond to electricity market signals, final customers should have the possibility to sell to the electricity markets the flexibility value of their Smart Buildings, with potential monetary gains.

Smart Building upgrades have their own unique sets of financing needs. Smart building upgrades have extremely short pay-back times, while many energy efficiency measures have long pay-back times of up to 20 years. Therefore, combining smart technologies with energy efficiency renovations has the potential to reduce the financial burden on the building owner.

- **Increased focus on demand generation:** every building renovation programme can be described from a supply and demand point of view. The supply dimension has to do with the supply of financing and energy services, while the demand denotes customer engagement and thus project uptake. Programmes often have a strong focus on the supply side while not paying enough attention to demand. As a result, the market is experiencing long marketing cycles for building renovation and high transaction costs per project. It is important to devise strategies for customer outreach based on best practices in the market as well as evidence-based consumer research insights. In order to motivate people and businesses to act, building renovation programmes must be aligned with the local drivers for investments, which vary by country, age, socio-economic group and asset class. Recent studies show that the stronger drivers tend to be comfort, wellbeing and energy savings<sup>2</sup>. With the ongoing energy transition, the monetisation of flexibility services is expected to also gain in relevance.
- **Strengthening Capacity Building and Offering Technical Assistance:** Internal capacity-building involves training of the program staff and offering vocational training to energy services contractors and installers. Energy services contractors often lack the tools needed to gain more customers. Technical assistance to home and commercial building owners is necessary because few home and building owners are experts in smart technologies. The trust in energy services contractors and in project performance/savings is low, therefore it is key to provide information from a trusted source.
- **Standardisation nationally and across Europe:** Capital markets require large volumes of projects with clearly defined risk and return. The majority of building renovation projects is not standardised, which increases the need for due-diligence during the underwriting process on the investor-side and thus results in higher transaction costs. In order to attract further private capital, project development process, documentation, and project financing structures must be harmonised across markets.

The financing instruments outlined in this paper, to a varying degree, address these issues.

### 3. BRIDGING PUBLIC AND PRIVATE FINANCE

Nearly all European buildings<sup>3</sup> are inefficient and at the current 1% annual renovation rate it would take around a century to upgrade the building stock to low-carbon, smart and efficient levels<sup>4</sup>.

To target this inefficiency of the EU building stock, **the EU has increased the allocation of public funds available for sustainable energy renovation in buildings**, for example:

- over the period 2014-2020, the **European Regional Development Fund and the Cohesion Fund** is expected to allocate €18 billion to energy efficiency, €6 billion to renewable energy - notably in buildings and district heating and cooling. This is three times more than in the previous 7-years period and has a potential to leverage a much larger amount of national public and private co-financing, reaching an estimated total of around €27 billion<sup>5</sup>;
- as part of the Investment Plan for Europe, **the European Fund for Strategic Investments (EFSI)** launched in 2015 has targeted the sustainable energy renovation in buildings as an area where pooling of projects and public guarantees can make a difference. An example is the €100 million debt facility to finance building renovation in France<sup>6</sup>. Its extension, EFSI 2.0, should unlock private financing for energy efficiency and renewables in buildings at a greater scale;
- the European Investment Bank (EIB) has recently adopted a brand-new financial instrument - **the Smart Finance for Smart Buildings Facility** – to unlock €10 billion of public and private funds until 2020 for energy efficiency and renewables. This will be done through using EU grants as a guarantee for these projects, creating a market for building renovation while aggregating projects, de-risk energy efficiency investments and optimising the use of public funds<sup>7</sup>.

While the total amount of public funding, in particular for energy performance improvements in buildings, is growing, **the reality at national level is more heterogeneous**. The analysis of the 223 national instruments providing public funding specifically for energy efficiency over the period from 2012 to 2014 points out increases in funding in 14 Member States, but 8 countries show downward trends or very substantial reductions in public funding<sup>8</sup>.

The recent report by the High-Level Expert Group on Sustainable Finance estimates **the gap to deliver the EU's climate and energy policies at €180 billion needed each year, which cannot be filled by public funds alone**. More specifically, the ITRE Committee of the European Parliament<sup>9</sup> highlights that the largest investment gap (around €137 billion annually) lies in the building sector. This means increasing the annual investments of over 130% if the EU's energy and climate targets are going to be met. There is a need for a substantial amount of private financing to enter the building renovation market. In order to attract private finance to the market, it is important that **different sources of financing are enabled to compete for projects on an equal playing field**. Today, the banking industry and large financial funds have strong networks of regulations supporting them, and further resources are being spent to facilitate their participation. While they are necessary for the success of the transition, relying exclusively on these traditional financiers limits the opportunities of leveraging financial means for smart and sustainable building investments.

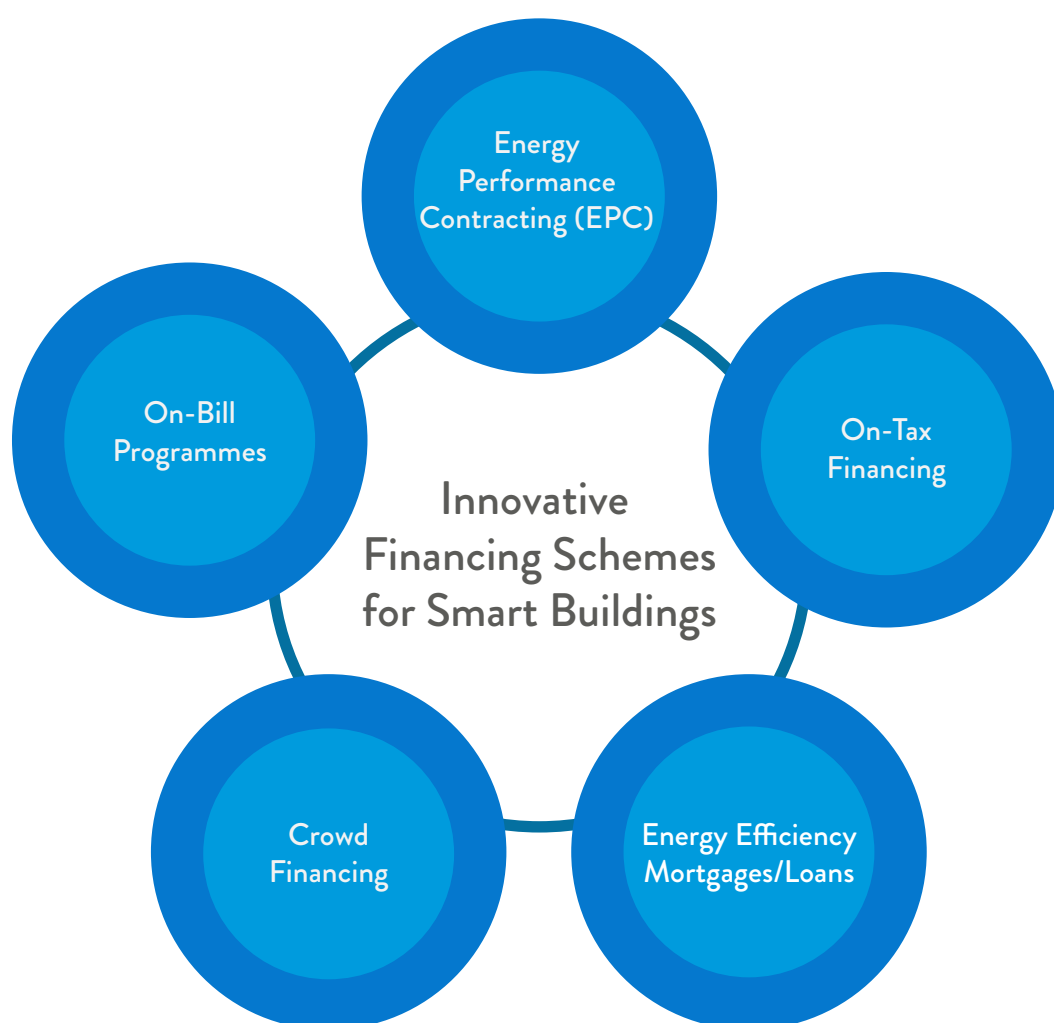
Public funds can help lower the cost and risk of financing and support the development of building renovation programmes. At the same time, private sector can bring in new innovative models and substantial capital. Thus, **properly leveraged public funding is a key base for a strong and sustainable market for building renovation that is driven by the private sector in tandem with cities and local authorities**.

Several trillion euros of investments in the energy transition will be made up of relatively low risk investments. Therefore, both the sheer volumes and the returns of the investments themselves will create substantial earnings for the entities providing the money. New sources of financing, including the direct involvement of citizens and innovative service providers, should be actively enabled to participate in the necessary investments and not be excluded from this opportunity.

## 4. FINANCING TOOLS AND PRACTICAL IMPLEMENTATION

**Innovative financing schemes** enable building renovation without burdening the home, business or municipality, while generating energy savings, promoting demand-side management and demand-side flexibility across all building types. Moreover, these models allow for the participation of both large and small service providers, thereby supporting competition and local job creation. The following mechanisms have proven highly successful at creating a stable pipeline of projects internationally.

Timing is perfect for national policy-makers to have a good appreciation of existing smart financing schemes as Member States incur in the crucial implementation of the Energy Performance of Buildings Directive (EPBD) review which entails the definition of ambitious national renovation roadmaps and their correct realisation.



### a) ENERGY PERFORMANCE CONTRACTING (EPC)

An Energy Performance Contract is a contractual arrangement between the client or project owner and the energy services provider. It is designed to help improving the energy productivity of buildings and provide guaranteed energy savings – all without the need for upfront capital investment.

The measures and solutions that can be introduced through an EPC are diverse and may include new systems or upgrades of LED lighting and controls, efficient heating, ventilation and air-conditioning systems, building management systems, CHP, renewable and low carbon electricity and heat generation, etc.

The impact of these measures is measured and verified.

A fund provides the upfront capital and the customer makes payments only in accordance to the money saved through their reduction in energy consumption. Therefore, the customer does not have to pay for the investments upfront and gets the building upgrade – or the Smart Building for ‘free’.

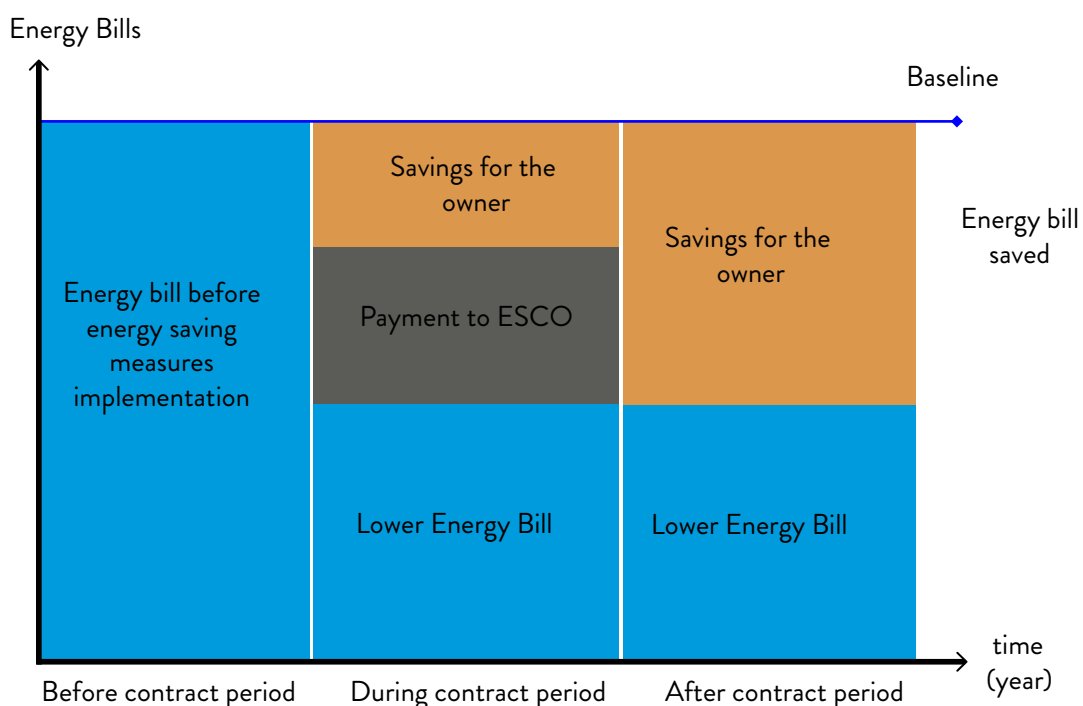
The savings are monitored during the whole term of the contract. This allows to sell the improvement in energy performance as a service (rather than as a set of technologies). Such an approach is important because it means that customers and municipalities do not need to increase their level of debt to upgrade their buildings or businesses. Rather, they can buy heating as a service, or lighting as a service etc.

Governments should be aware of the recent change in EUROSTAT rules easing EPC contracting for municipalities and allowing for EPC to be off balance sheet. The new rules also lay out the conditions under which the National Statistical Institute (NSI) of each Member State can decide about the sector classification of EPC contracts, following the statistical rules provided by this Eurostat guidance note, which is based on general ESA10 rules<sup>10</sup>. Eurostat and the European Investment Bank (EIB) issued on 8 May 2018 a Guide on the statistical treatment of EPCs, explaining the concept in considerable detail<sup>11</sup>.

It is estimated that the EU public sector could save at least €4.5 billion annually in energy costs if public building stock were to be refurbished using EPCs. The analysis has been made considering only the Administrative, Healthcare and Educational building stocks older than 25 years in major Member States. This potential equates to 14 million annual CO<sub>2</sub>-tonnes of avoided emissions, which would have a major impact on the EU’s de-carbonization goals, without negative impact on taxpayers<sup>12</sup>.

In 2017 roughly \$4.6 billion were invested in EPCs by public entities in the US. In Europe, this figure was only around \$150 million. It’s believed that the change of rules could increase the EU EPC market to even higher levels than in the US.

In addition, it is widely accepted in the US that for every \$10Million in EPC, 95 jobs are created, thus boosting also the local economy<sup>13</sup>.





## b) ON-TAX FINANCING

On-tax financing is a type of financing mechanism used to collect the repayment for money that was lent for investments in building improvements that meet a ‘valid public purpose’, e.g. save energy or produce renewable energy, water conservation upgrades. On-tax financing builds upon an existing relationship that municipalities have with their citizens – the property tax system. Typically, investors lend money for retrofits up-front and then get repaid regularly through an additional charge on a property-related tax bill.

On-tax financing is used globally; in the US it is called PACE (Property Assessed Clean Energy) and in Australia it is termed EUA (Environmental Upgrade Agreements). In 2018, the PACE market in the US surpassed \$6 billion in funded projects, including the retrofit of over 220,000 homes, which resulted in more than 50,000 new local jobs and the creation of hundreds of new companies.

In Europe, the EuroPACE programme<sup>14</sup> is inspired by the US PACE model: it aims at boosting building renovation in homes, offices, hotels, multi-family and mixed-use properties. While the primary focus is on energy efficiency, EuroPACE can be also used for demand-side flexibility, renewable energy upgrades, water conservation improvements and a wide range of accessibility<sup>15</sup>, structural integrity<sup>16</sup> and other projects that improve habitability<sup>17</sup>. The EuroPACE model has the following characteristics:

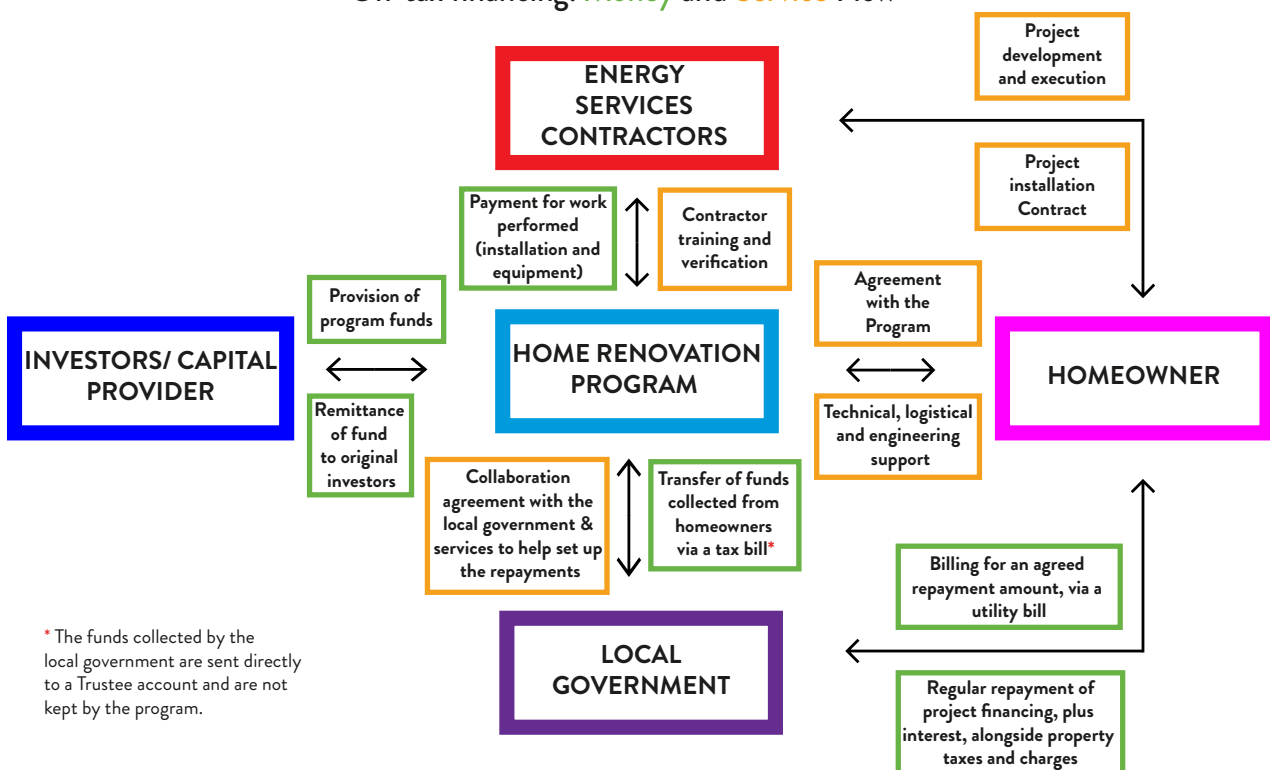
- it covers up to 100% of a project’s hard and soft costs;
- it offers technical support to homeowners throughout the full project journey;
- financing can be extended up to 20 years in line with useful life of the improvement;
- EuroPACE can be combined with utility, local, state incentive programmes, subsidies and grants;
- EuroPACE may stay with the property and not an individual in case of sale.

EuroPACE financing is funded through the issuance of bonds that are of low-risk and stable yield investments due to the enhanced repayment security, highly appreciated by institutional investors. Annual repayments typically do not exceed the energy savings (or the value of generated energy) resulting in a cash-flow positive situation for a homeowner or business.

EuroPACE programs will be standardised in terms of underwriting criteria to ensure that projects can be aggregated and packaged for securitization through green bonds issuances.

Currently, an EuroPACE program is in development in a couple of regions in Spain where the original focus is on homes and multi-family buildings. In parallel, EuroPACE replication efforts across EU-28 are in progress.

### On-tax financing: Money and Service Flow



### c) ON-BILL PROGRAMMES

On-bill programmes use a similar mechanism as on-tax financing. This approach has been used in the US since the early 1990s<sup>18</sup> and was adopted also in the UK.

There are two main types of on-bill programmes: on-bill financing (OBF) and repayment (OBR).

In both options a utility or private lender supplies capital to a customer to fund energy efficiency, renewable energy, or other generation projects in buildings and is repaid through regular payments on an existing utility bill. In both OBF and OBR structures, the utility collects repayments from the end customer via its monthly utility bill.

The distinction lies in the source of capital:

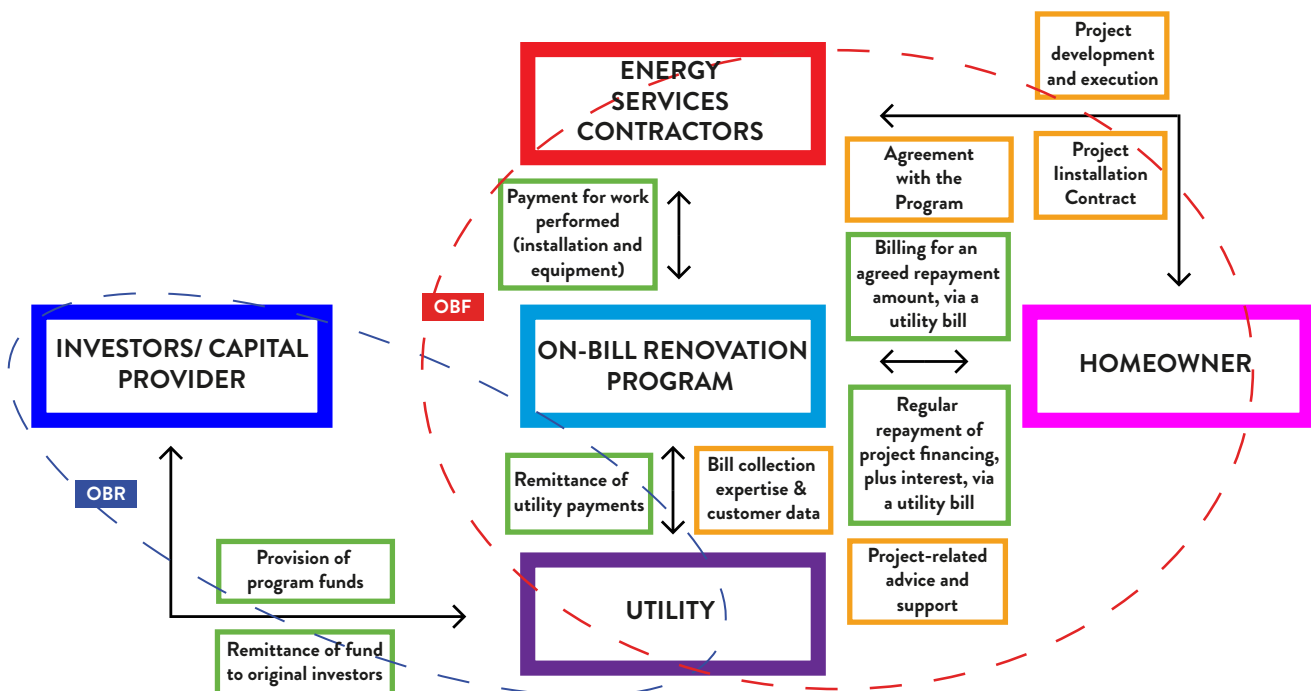
- OBF programmes use public money, ratepayer funds, or utility shareholder funds to pay for projects, and this capital typically comes at interest rates that are very low or even 0 percent;
- OBR programmes use private capital from third-party investors instead. OBR capital typically comes at a higher interest rate than OBF, though it is often cheaper than the market rate for loans due to the added security provided to investors by attaching the repayment obligation to the customer's utility bill.

On-bill programs typically are administered by third party entities that handle the financing and program management issues. On-bill financing programs can also be administered by the utilities directly.

The main advantages of an on-bill recovery program are:

- Simple repayment: customers continue making payments on one bill. Although the customer receives a monthly utility bill with an extra cost for the retrofit, in most cases the electricity costs drop due to the renovation and the bill is lowered or remains the same;
- Positive Cash flow: if the projects are structured with a positive savings to investment ration, the on-bill component is less than energy saving, thus producing positive cash flow for the customer;
- Transferability: debt can be transferable as it is tied to the property meter and not the individual householder. This aspect depends on the program and legal framework in each locality;
- Long-term: utilities can structure on-bill repayment to allow for deep retrofits with long-term paybacks.

#### On-bill repayment and financing: Money and Service Flow



## d) CROWD FINANCING

Crowd financing allows members of the public to fund projects and to earn from doing so. These projects may be local, creating a win-win for local communities, or could be standard funds which allow participants to back certain projects or aggregated groups of projects.

Several examples already exist in Europe:

- Ecrowd! is a Spanish Collective Financing Platform (PFP) which allows the financing of a wide range of projects, as building renovation, through collective loans – crowdlending. Thanks to this innovative solution, companies are able to finance themselves through a large group of people without having to go to the bank. The small lenders, on their side, receive a financial return higher than what would be available from saving their money in a bank. The terms and risks are explained as a loan agreement. Through the crowdlending, people with projects can diversify their sources of funds while private small investors benefit from higher returns and can decide the use that is given to their money, giving a positive impact in the whole relationship;
- Another innovative fundraising model is the equity-based crowdfunding by the British investment platform Crowd Cube. The key principles of this model are that anyone can invest money in return for equity in a business and that entrepreneurs can bypass business angels and banks financings by receiving funding directly from the general public. The platform operates on the "all or nothing" model, meaning that the funds are taken from investors only when a pitch reaches its investment target.

Crowd financing platforms most often use national currencies, but can benefit as well from asset-backed tokens, which use block-chain to reduce fraud and increase transparency (increasing the trust and security of participants).

Some practical examples already exist:

- EnergiMine - blockchain-based approach to energy efficiency, in which a UK firm launched its own cryptocurrency, ETK, via an 'Initial Coin Offering' that lasted just 82 minutes and raised \$15M. ETK tokens are provided to EnergiMine's B2B customers, who then issue them as rewards to their own staff and customers when they demonstrate energy-saving behaviours. It is intended that ETK tokens should, in future, be usable as a kind of discount voucher, e.g. against energy bills and energy-using appliances. They can also be exchanged for fiat currency on cryptocurrency exchanges;
- WePower - novel blockchain-based financing solution for renewable project developers in which bespoke project tokens are sold to private investors, in effect pre-selling them renewable energy, at a discount, before development has begun. Token holders benefit from cheaper energy and project developers gain access to a novel funding source, reducing their dependence on the banks who, typically, now have stricter minimum lending criteria following the recent withdrawal of subsidy schemes. In addition, the WePower platform itself was funded via the launch of a WePower cryptocurrency, raising \$40M from 22k contributors during its 2018 Initial Coin Offering.

## e) ENERGY EFFICIENCY MORTGAGES/LOANS

A new product from the banking sector, "standardised energy efficiency mortgages", will channel private capital to drive Smart Building renovations: on the basis of a lower capital charge, banks will offer the possibility of a preferential interest rate and/or additional funds at the time of origination of the mortgage/re-mortgaging in return for a measurable energy performance improvement in their property.

This is the key objective of the Energy Efficient Mortgages Initiative<sup>19</sup>, supported by Horizon 2020, which gathers major banks, mortgage lenders, data providers, valuation professionals, companies and organisations from the building and energy industries.

The development of a "standardised energy efficient mortgage" rests on two assumptions:

- 1) improving the energy performance of a property has a positive impact on property value, reducing a bank's asset risk;
- 2) borrowers have a lower probability of default as a result of more disposable income in the household due to lower energy bills, reducing a bank's credit risk.

While differentiating between 'sustainable' and 'conventional' funding, the Initiative seeks to develop a clear understanding of how to capture the optimisation of energy performance in buildings within financial institutions' lending practices using key indicators, as the Energy Performance Certificate (EPC).

Although the catchy name of this type of mortgages seems to limit the improvement of the energy performance of a building just through (passive and active) energy efficient solutions, the uptake of all decentralised energy resources is also incentivised.

The Initiative does not pre-suppose what kind of solutions a customer should put in its house as part of a refurbishment: key is the possibility to measure the realised improvement in energy performance through EPC ratings.

Following the roadmap of the Initiative, such standardised mortgages should be developed by the time that Member States will be confronted with the implementation of the EPBD review.

## 5. SUMMARY AND CONCLUSIONS

To achieve smart and sustainable renovation of European buildings, it will not be sufficient to expect that Europeans will have the capacity and the means to take out standard bank loans. At the same time, it is also unrealistic to expect public funds to cover the full cost. Therefore, it is critical that the innovative financing mechanisms described in this paper become widely known and also supported at EU and national levels.

**We recommend that the European Commission includes the mechanisms described in this paper in its Guidance Note on the EPBD review to Member States to guide and support the implementation of national renovation strategies.**

Moreover, workshops and information sessions about innovative financing mechanisms should take place at the EU and national levels with dissemination materials easily available. Without such support, businesses and consumers are often left to ‘discover’ such mechanisms for themselves and even inform their national governments they exist. This is an unrealistic burden to place on commercial parties.

For example, crowd financing is not yet evenly supported, nor are representatives even present in many stakeholder groups. Further understanding and support for consumer-funded financing options should be provided at EU level in order to guide Member States in their implementation of the EPBD review and ensure consumers are not cut out of investment earnings.

smartEn therefore encourages the Commission to make realistic and viable financing options a standard information alongside the support to be provided to Member States in drafting and implementing national renovation strategies.

**Finance is a key tool for success.** It should be treated as such.

## FOOTNOTES

<sup>1</sup> <https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report%20EEFIG%20v%209.1%2024022015%20clean%20FINAL%20sent.pdf>

<sup>2</sup> [www.velux.com/article/2017/comfort-and-well-being-drive-renovation](http://www.velux.com/article/2017/comfort-and-well-being-drive-renovation)

<sup>3</sup> [www.eceee.org/all-news/news/news-2018/new-report-about-97-of-eus-building-stock-not-considered-energy-efficient/](http://www.eceee.org/all-news/news/news-2018/new-report-about-97-of-eus-building-stock-not-considered-energy-efficient/)

<sup>4</sup> Impact Assessment for the amendment of the Energy Performance of Buildings Directive, SWD(2016) 414

<sup>5</sup> European Commission's estimate based on financial tables of the operational programmes 2014-2020 for the thematic objective "supporting the shift towards a low-carbon economy" overall

<sup>6</sup> Énergies POSIT'IF, a public-private company that aims to make condominium buildings in the Île-de-France region more energy efficient

<sup>7</sup> [https://ec.europa.eu/info/news/smart-finance-smart-buildings-investing-energy-efficiency-buildings-2018-feb-07\\_en](https://ec.europa.eu/info/news/smart-finance-smart-buildings-investing-energy-efficiency-buildings-2018-feb-07_en)

<sup>8</sup> <https://www.ecofys.com/files/files/ecofys-2016-public-funding-for-energy-efficiency-in-the-eu.pdf>

<sup>9</sup> [http://www.europarl.europa.eu/RegData/etudes/STUD/2018/614223/IPOL\\_STU\(2018\)614223\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2018/614223/IPOL_STU(2018)614223_EN.pdf)

<sup>10</sup> The European System of Accounts (ESA 2010) is a European accounting framework that allows a systematic and detailed description of the economy

<sup>11</sup> <http://ec.europa.eu/eurostat/web/government-finance-statistics/methodology/guidance-on-accounting-rules>

<sup>12</sup> Honeywell calculations 2018

<sup>13</sup> Navigant Research, "Navigant Research Leaderboard: ESCOs - Assessment of Strategy and Execution for 14 Energy Service Companies", 4Q 2017

<sup>14</sup> An Horizon 2020 funded initiative launched in 2018. To follow the progress of the EuroPACE project, please visit [www.europace2020.eu](http://www.europace2020.eu)

<sup>15</sup> This includes improvements aimed at people with limited mobility (e.g. elevators, stairs, rails).

<sup>16</sup> This includes various structural façade renovations and other fundamental structural issues.

<sup>17</sup> Projects aimed at improving air quality, eliminating mould, and other health hazards in homes and buildings.

<sup>18</sup> [www.nrdc.org/sites/default/files/on-bill-financing-IB.pdf](http://www.nrdc.org/sites/default/files/on-bill-financing-IB.pdf) Today, on-bill programs run in New York, California, Connecticut and several other states within the USA, as well as tested in Australia.

<sup>19</sup> Energy Efficient Mortgages Initiative relies on the EeMAP (Energy Efficient Mortgages Action Plan) and EeDaPP (Energy Efficient Data Protocol and Portal) Initiatives.



---

# NOTES

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



**smartEn**  
Smart Energy Europe