



European Rental Housing Framework for the Profitability
Calculation of Energetic Retrofitting Investments

649656 — RentalCal — H2020-EE-2014-2015/H2020-EE-2014-3-MarketUptake

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**Funded by
The European Union**



RentalCal

Nr. 649656

Fact sheets regarding financing conditions

Deliverable

Nr. 5.4

Date

31.7.2016

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Statement of originality and disclaimer:

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I. Project synopsis

Objectives of the project

The EU directive 2010/31 on the energy performance of buildings (recast) of 19th May 2010 (EPBD recast)¹ sets out requirements regarding the energy performance of new buildings, as well as minimum requirements for the energy performance of existing buildings, building units and building elements that are subject to major renovation (Art. 1 No. 2 (c)). These minimum requirements shall not prevent any member state from maintaining or introducing stronger measures. As a minimum requirement, a “cost optimal level” shall be reached (Art. 14, Art. 2 No.14). The EPBD recast directive establishes the calculation for the “cost-optimal level” of minimum energy performance requirements including a comparative methodology framework, distinguishing between new and existing buildings and between different categories of buildings. Unlocking the barriers to proven economic saving potentials offered by energy efficiency investments in the existing building stock are considered crucial for meeting European energy efficiency targets. This is especially important for rental housing, which represents the majority of the multifamily housing stock in most participating countries.

Although the calculation methodology established within the EPBD framework suggests that in general, retrofitting investments are financially viable within given cost conditions, there is no sufficient energy investment.

One reason is the limitation of the methodology framework to the financial perspective of the owner-occupier, thus neglecting other relevant stakeholder groups such as the rental housing sector.

A set of market failure mechanisms summarised under “split incentives’ barriers” are obstacles for investment in the rental housing sector. Split incentives may not only arise from the factual separation of investor and beneficiary (landlord-tenant disincentive), but also from asymmetrical risk exposition during the refinancing period (temporal disincentives) or from free rider problems (landlord-landlord dilemma) within owners’ associations.

Article 19 of the EU directive 2012/27 on energy efficiency of 25th October 2012 states, that “Member States shall evaluate and if necessary take appropriate measures to remove

¹ http://www.eceee.org/policy-areas/buildings/EPBD_Recast/EPBD_recast_19May2010.pdf

regulatory and non-regulatory barriers to energy efficiency, without prejudice to the basic principles of the property and tenancy law of the Member States, in particular as regards the split of incentives between the owner and the tenant of a building (...)” with a view to ensuring that these parties are not deterred from making efficiency-improving investments that they would otherwise have made by the fact that they will not individually obtain the full benefits or by the absence of rules for dividing the costs and benefits between them (...)”.²

Therefore, the essential challenge for improving the attractiveness of investments within the rental housing industry will be the removal or mitigation of investment barriers. To date there is no standardised methodology for calculating the profitability of refurbishment investments, not even within the property valuation standards of individual countries.

Objective I: profitability assessment in the rental housing sector

RentalCal’s first objective is to develop a comparable methodology for the profitability assessment of energy efficient retrofitting investments in the rental housing sector. This methodology needs to incorporate given national cost levels (investments and operational costs) and efficiency improvements on the one side. On the other side it needs to consider returns (rental and appreciation returns of “green value”) as well as technical, legal and financial framework conditions (construction costs, capital costs, taxation e.g. depreciation allowances, legal status of contract rents etc.).

Objective II: Improving the transparency of investment conditions

Due to a lack of supranational competencies in the housing sector, there is a lack of systematic and comparable assessment of the level of current investment barriers in EU countries and their impact on the renovation rate in the rental housing stock. Moreover, satisfactory information is not even available on the level of a mere qualitative assessment of specific issues like the handling of landlord-tenant-disincentives within national rental statutes.

Therefore, the second objective of RentalCal is to provide comparable and transparent information on the profitability of energy efficiency investments that can be used both for

² <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:en:PDF>

the assessment of investment decisions, and for the comparative analysis of existing barriers in the private rental housing stock of participating countries. Within this objective, the technical, legal, financial and institutional framework conditions for energy saving investments in the rental housing sector of selected European member states will be analysed. Furthermore, the project emphasises the cross-national comparative analysis of the profitability calculation of energy retrofitting investments. In this context, RentalCal aims to contribute to a harmonisation of the methodologies and calculation standards in the field of profitability assessments for energy retrofitting investments in the existing housing stock.

Objective III: disseminate knowledge on green value issues in the rental housing industry

RentalCal specifically aims to prepare the ground for investment in the existing rental housing stock. In this sense, the development of a theoretical framework can ultimately help change the behaviour of property investors and ought to have great impact for climate change adaptation in the real estate industry. The immediate beneficiaries of our output are landlords and property investors who will be better informed regarding the feasibility of a proposed investment. With this approach RentalCal is significantly targeting the business case for energy efficiency retrofitting which is extremely important. In doing so, the proposed project provides insights into the pricing of energy efficient buildings that stakeholders can use to assess the enhancement of asset values and understand the market mechanisms. This will ultimately strengthen the financing and attractiveness of sustainable energy investments.

The RentalCal Consortium

RentalCal is an international research project funded by the European Union under the H2020 framework that links together eleven partner organisations - universities, public research institutes, and practitioners in the field of real estate economics, housing policy and energy efficiency.

The RentalCal consortium partners represent housing markets from eight EU member states (Czech Republic, Denmark, France, Germany, Great Britain, Poland, Spain and the Netherlands), each with a distinct regulatory and socioeconomic framework for housing provision. RentalCal's consortium members cover a majority share of EUs largest rental

housing markets with a total of about 33 million dwellings in the private rental sector, with about 46 % of it built in 1980 or earlier.

II. The scope of WP 5 in the general project context

The core objective of WP5 is to compile, interpret and discuss the empirical evidence on the market pricing of energy-efficient features and buildings (market framework conditions). In addition to carrying out econometric analyses in selected European markets, this work package conducts a comparison of the relevant national, regional and local trends in the take-up of energy-efficient buildings and the potential constraints for pricing energy-efficient building features. Based on this information, policy recommendations for the removal of existing market barriers are derived in conjunction with the results of WP3 (legal framework) and made ready for communication and dissemination activities related to policy makers in WP9.

This work package has also the objective of analysing and outlining existing subsidies and financing mechanisms for investments in energy efficiency in the private rented sector of the participating countries (financial framework conditions). Particularly, the focus is on compiling information on availability of green mortgages and other debt financing instruments with favourable rates and conditions.

Work package 5 results are presented in the following deliverables:

- D5.1: Report with 8 country specific sections, containing a description of packages of measures and best practice approaches for reducing/removing market barriers for increased willingness to pay.
- D5.2: Report with 8 country specific sections, containing a description of “green-premiums”, i.e. energy efficiency related value drivers (rental premiums, sales price premiums, higher occupancy rates) and operating costs.
- D5.3: Report with 8 country specific sections, containing a description of grants and other subsidies for each partner country.
- D5.4: Report with 8 country specific sections, containing a description of financing conditions (Interest rate, durations, conditions) for each partner country.

- D5.5: Report featuring the results of four country specific empirical studies (hedonic pricing models of green premiums)

III. Interrelation with other work packages

The setting of WP 5 within the project is presented in Figure . Both market and financial framework conditions will be made available in WP5 for using the generated data as input parameters for profitability calculations in WP6. All information collected will be analysed and aggregated in the form of comprehensive country specific fact sheets (brief descriptive summary and basic statistics/analysis of collected data).

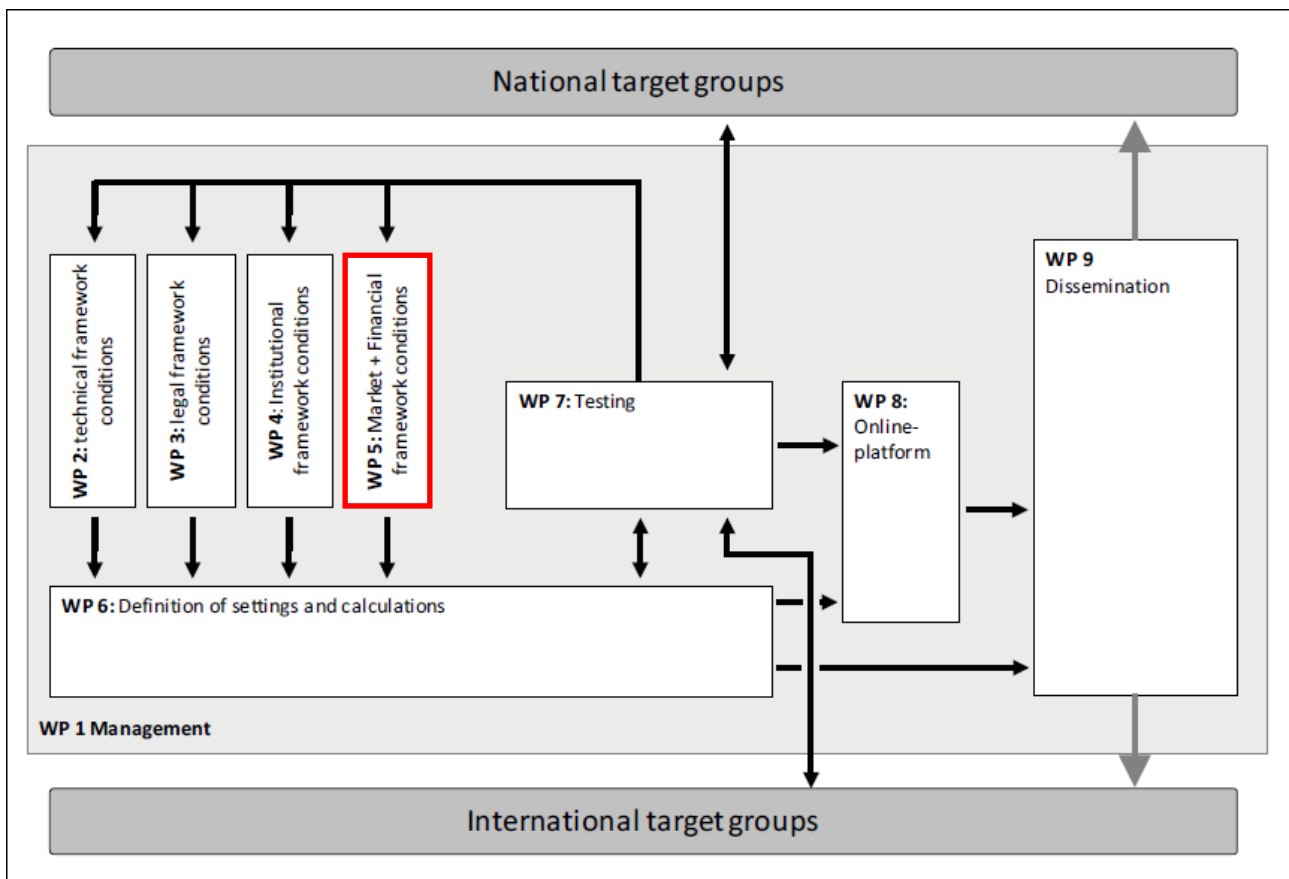


Figure 1 work package flow chart

1 Overview on research efforts of deliverable 5.4

1.1 Current state of research

Policies and programmes to stimulate energy efficiency investments in the built environment surfaced during the decades following the 1970s oil shocks. In recent years, with a renewed emphasis in the area of energy efficiency spurred by climate change mitigation and energy security goals, investments in this area have been justified and promoted based on their payback periods, defined as the number of years required to fully recover the upfront investments through reduced energy bills (Nevin and Watson, 1998). In recent years, in many EU countries, government agencies have promoted and introduced innovative financing models for residential energy efficiency retrofits. Similarly, banks and lenders in the private sector have introduced green mortgages and interest rate discounts for green retrofits. European Union financial instruments have also been introduced to stimulate energy efficiency related investments. Despite this, energy efficiency retrofits involve high up-front costs which can only be recouped over time through lower running costs. Financing Energy Efficiency is thus still in its infancy with a significant proportion of the energy efficiency improvement potential being unrealised (BPIE, 2015). This report reviews the common instruments and measures available in the countries in the RentalCal consortium.

1.2 Central questions to be answered in D 5.4

This deliverable compiles and compares financing options and practices in relation to energy efficiency investments in the private rented sector of countries in the RentalCal consortium. In so doing, insights into financing models and practices relevant for assessing profitability of green retrofit investments in the private rented sector are provided.

1.3 Procedure

- Chapter 1 contains an overview on the project and a description of the work flow
- Chapter 2 contains the summarising results and cross country comparison fact sheets.
- Chapter 3 contains the individual country report sections

2 Results: Financing conditions in a comparative perspective

2.1 Financing energy efficiency measures: A comparison of institutions, policies and goals in participating countries

The below factsheet shows a range of energy efficiency policy instruments and measures across the countries in the RentalCal consortium. In Czech Republic, a few government-backed financing options are available to investors but market-based financing options are limited. Similarly in Spain, Government-supported financing schemes are available via the Official Credit Institute and through the JESSICA-FIDAE programme. Despite this, in partnership with the national government, private banks such as Santander, Banco de Bilbao offer certain credits/loans devoted to energy efficiency projects with a relatively low interest rate. Some private banks also provide Green mortgages “eco-hipotecas” in which the interest rate is linked to the energy efficiency rating of the property. While in France, the most widespread financing option for energy efficiency retrofit for private landlords is the 0% interest rate on eco-loans, in Denmark, energy efficiency retrofits are normally financed by either real estate mortgages (Realkredit lån) or private mortgages (bank loans). In Germany, financing of retrofit investments is advanced and is perhaps one of the most developed in the EU. The KfW loans are available for up to 100 % of investment costs, depending on the scale of the retrofit. State`s banks such as the L-Bank Baden-Württemberg also provide energy efficiency loans based on the KfW terms. Some private banks such as Umweltbank and ethikbank also offer favourable financing schemes to their customers. In the Netherlands, the Enterprise Agency of the government (RVO) provides generous green loans with low interest rates. Furthermore, De Energiebespaarlening (the SVn), a combination of a public-and-private-led model, provides loans from the National Energy Savings Fund and via private banks such as Rabobank and ASN Bank. Private Banks provide their own financing instruments. For example, the Triodos Bank offers interest rate discounts in relation to the efficiency level of the dwelling. In Poland, the BGK (a state owned development bank) acts as an apex in a system of commercial banks extending commercial loans for thermo-modernization and energy refurbishment projects 20% of which can be covered by a premium financed from national Thermomodernization and Refurbishment Fund (TRMF) if the prescribed conditions are met. Similarly, in the UK, private

Banks such as the Ecology Building Society offer a range of green mortgage products and related renovation loans to its customers.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 1.4.1	Financing of energy efficiency investments - institutions and goals

Table 1: Cross country comparison financing of energy efficiency investments - institutions and goals

Variable	Major institutional sector involved in lending for real estate retrofitting investments	Major scope of institutions in this sector	Goals	Lending volume	Share of retrofitting lending volume	Data Sources
Czech Republic	Public/governmental banking institution; private/corporate banking institution. Not for Profit Organisations	Government agencies and the Commercial Bank	private banks: profits ; government agencies and not-for-profit: support of energy efficiency and renewable energy efforts	-	-	SFRB, 2015. EIB, 2015. EC, 2015.
Denmark	Public/governmental banking institution ; private/corporate banking institution	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies: support of energy efficiency and renewable energy efforts	Land owners Fund: Max 15 mill. D.kr per project	90-100 %	Grundejernes, 2016 Mybanker, 2016 Bolius, 2016
France	Public/governmental banking institution ; private/corporate banking institution	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies: support of energy efficiency and renewable energy efforts	202 Mds of Euros from this sum 63% are new loans = 127 Mds of €	-	ANIL, 2016. Developpement-durable.gouv.fr, 2015. Banque de France, 2015 SFGGAS, 2015
Germany	Public/governmental banking institution ; private/corporate banking institution	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies: support of energy efficiency and renewable energy efforts	KfW: ~ € 14 billion	KfW only: ~ € 3.5 billion -> 25%	KfW, 2016. Ethikbank, 2016. umwelt-bank, 2016. Lbank, 2016.
Netherlands	Public/governmental banking institution ; private/corporate banking institution	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies: support of energy efficiency and renewable energy efforts	-	-	RVO, 2016. Rabobank, 2016. ASN Bank, 2016.
Poland	Public/governmental banking institution ; private/corporate banking institution	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies: support of energy efficiency and renewable energy efforts	TRMF ~ € 2.5 billion (total over 20 yrs)	-	bgk.pl/fundusz, 2016. Bosbank, 2016.
Spain	Public/governmental banking institution ; private/corporate banking institution	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies: support of energy efficiency and renewable energy efforts	-	-	ICO, 2016. BOE, 2013
United Kingdom	Public/governmental banking institution; private/corporate banking institution. Not for Profit Organisations	Private banking, mortgage banking, government agencies	private banks: profits ; government agencies and not-for-profit: support of energy efficiency and renewable energy efforts	Green Deal: £59 million	-	Institute for Sustainability, 2013. Equitix, 2015. The Green deal Finance company, 2015. ARLA, 2013

2.2 A comparative analysis of financing practices in participating countries

In this section, financing practices, conditions and interest rates in relation to investments in residential properties and particularly energy efficiency investments are summarised. The below factsheet outlines financing conditions and practices in relation to energy efficiency investments of the countries in the RentalCal consortium.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 2.2.1	General national financing conditions

Table 2: Cross country comparison general national financing conditions

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards	Data Sources
Czech Republic	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: 10-30 years	Annuity and bullet loans	mortgage only mortgage or other securities <i>other securities only</i>	Mortgage loan fixed rate (75% LTV): 2.59%	EIB, 2015 EC, 2015
Denmark	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: 30 years	Annuity and bullet loans	mortgage only mortgage or other securities <i>other securities only</i>	Mortgage loan fixed rate (80% LTV): 4.0-4.7% APR - Mortgage loan variable rate (80% LTV): 1.3-1.7% APR Bank loan fixed and variable rate: 0.5-15.8% APR	Grundejernes, 2016. Mybanker, 2016 . Bolius, 2016.
France	Fixed over full payoff period	Long: 10-15 years	Annuity loans for natural persons. (Fixed over full payoff period). Annuity loans for social landlords (variable interest rate / index interest rate) Bullet loans for institutional investors and profit municipal public companies (depends on the financial strategy of the company).	56.8% a security 19.6% a mortgage 23.6% other	Mortgage loan, fixed rate, 3.27%, 5 years, 50% for a natural landlord. Private corporation: Fixed rate 2.40%, 10 years, 100% but it depends on the rating of the corporation e.g. recently for a municipal public company in Lyon (SACVL) with a S&P rating A+, 100%, 1.95%, 25 years. Public companies, not-for profit, cooperatives: 0%, up to 15 years, 100%	SFGGAS, 2015
Germany	<i>fixed over parts of the payoff period</i>	<i>medium - long</i>	<i>annuity and bullet loans</i>	<i>mortgage or other securities</i>	<i>75% LTV 5 year fixed rate: 1.24% p.a.</i>	The KfW, 2016
Netherlands	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: 7-15 years	Annuity and bullet loans	mortgage only mortgage or other securities <i>other securities only</i>	Triodos Bank Mortgage loan with IR between 1.8% and 3,8% when, LTV 65%, 1yr fixed rate period.	Moneywise, 2016 Ikinvesteers, 2016 Groenehypotheek, 2016. Triodos Bank, 2016
Poland	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Up to 10 years (ie short or medium) or long over 10 years	Annuity and linear loans are most common. Balloon and bullet rarely used but can be met in individual commercial agreements.	All types in use: mortgage only mortgage or other securities <i>other securities only</i>	Up to 95%. But Average is 75%	DJW, 2014. ECBC, 2015
Spain	variable Rate and fixed	Between 2-15 years Short-Long	Annuity and bullet loans	mortgage only mortgage or other securities <i>other securities only</i>	75% LTV 5 year fixed rate (monthly) at 2.86%.	Bank of Spain, 2016
United Kingdom	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: Typically 10 years and over.	Annuity for individual investors bullet for larger financial institutions and social housing investors	Mortgage only mortgage or other securities <i>other securities only</i>	75% LTV 5 year fixed rate: 2.81%	The Green Deal Finance Company, 2015. Money saving expert, 2015. Bank of England, 2014. HSBC, 2016.

The ranges of interest rates on loans and on savings currently available to investors in countries of the RentalCal consortium are summarised in the below factsheet. Given that all these countries are in the EU single market, interest rates on lending and borrowing are very similar across the countries.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 2.2.2	National interest level

Table 3: Cross country comparison national interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)	Data Source
Czech Republic	4-6%	5-15%	15-30%	0.45%	2.0% - 10-Year Czech Government Bond Yield	Scope Rating, 2015. CSAS, 2016
Denmark	4-6%	5-15%	15-30%	0.75%	1.47% - 10-Year Danish Government Bond Yield	Scope Rating, 2015. Pengepriser, 2016
France	3-4%	4.5-9%	Not used for energy retrofitting	0.3512%	1.95% - 10-Year French Government Bond Yield	Euribor-rates, 2016. CAFPI, 2016.
Germany	4-6%	5-15%	15-30%	0.60%	1.4% - 10-Year German Government Bond Yield	Bloomberg, 2016. Property-week, 2013. Scope Rating, 2015.
Poland	4-6%	5-15%	15-30%	0.6%	4.1% - 10-Year Polish Government Bond Yield	Scope Rating, 2016. nbp.pl, 2016
Netherlands	4-6%	5-15%	15-30%	0.40%	1.64% - Netherlands 10-Year Dutch Government Bond yield	Bloomberg, 2016. Scope Rating, 2015
Spain	4-6%	5-15%	15-30%	0.4%	3.9% - 10-Year Spanish Government Bond Yield	Bloomberg, 2016 Bank of Spain, 2016
United Kingdom	3-5%	5-15%	15-30%	2k+ 0.50% £50k+ 0.60%	2.19% - 10 year UK Government bond yield	Property week, 2013. Scope rating, 2015. Data.okfn.org, 2016. HSBC, 2016

3 Country report section

3.1 Czech Republic

3.1.1 Financing energy efficiency measures: Institutions, policies and goals

The State Housing Development Fund (SFRB) is the key financial programme used to improve the Czech housing market, including the rental segment. The main goals of the SFRB include supporting the construction of new flats, and conducting energy-efficient retrofitting of the existing housing stock (particularly, large panel buildings) as well as other infrastructure investments at municipal level. The Czech housing policy also promotes low interest rates, recoverable credits and bank guaranteed loans in relation to energy efficiency investments. For example, recoverable credits provided by the State and municipalities, in some cases in collaboration with banks, have a maturity period depending on the specific programme but it is usually between 10 and 30 years. Energy efficiency retrofits are financed via several national schemes. For example, several programmes provide interest rate discounts, bank guarantee for credit payments and professional technical help and consulting in relation to energy efficiency investments. These programmes are available to investors in the rental sector and include Panel2013+ which offers low-interest long-term credits for repairs and modernisations of multi-dwelling buildings, Program 150 which offer preferable loans for the repair and modernisation of apartments and houses, and new Green Savings 2013 which seeks to construct family houses with very low energy demands. Despite the main beneficiary of the improvements being tenants, the programmes usually target landlords to invest in energy efficiency.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.1.1.1	Financing of energy efficiency investments - institutions and goals

Table 4: Czech Republic financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
institutional sector 1: Public	State Housing Development Fund (SFRB):	Government agency	Implementation of the State Housing Policy	National		
	Panel 2013+ program		low-interest long-term credits for repairs and modernizations of multi-dwelling buildings	National	€ 25 million in 2016	
	Program 150		Concessional loan for the repair and modernization of apartments and houses	National	€ 2 million in 2016	
institutional sector 2: Public	State Environmental Fund (SFZP):	Government agency	The fund provides financial support in the form of subsidies, loans and contributions to partial interest coverage.	National		
	New Green Savings 2013		Construction of family houses with very low energy demand	National	€ 40 million until 2020	
Reference year of data and source	SFRB, 2016	SFRB, 2016	SFRB, 2016	SFRB, 2016	SFRB, 2016	

3.1.2 National financing practices

The following financing practices are used in the various national schemes. In the Panel programmes, the interest rate is based on the reference rate of the European Union (0.52% p.a in 2015.) and the term of the loan. The LTV limit is typically 75%. Similarly, in the Jessica Programme, the interest rate charged is based on the reference rate of the EU but increases by 1% if the payback period is above 10 years. In the Programme 150, loan amount of CZK 150,000 per applicant is offered at an interest rate of 2% per annum throughout the repayment period; the payback period is usually 10 years for couples and individual investors under the age of 36 for flats or houses in private ownership or co-ownership.

Similar to the other EU states, banks and financial institutions in Czech Republic offer an interest rate of approximately 4-6% on senior residential loans 5-15% on junior loan and 15-30% on mezzanine. The short term (3 months) interest rate on savings is approximately 0.45% and the long-term 10 years interest rate averages 2.0% based on the Czech government 10-Year Bond Yield over last 5 years.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.1.2.1	National financing conditions and practices

Table 5: Czech Republic national financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: 10-30 years	Annuity and bullet loans	mortgage only mortgage or other securities other securities only	Mortgage loan fixed rate (75% LTV): 2.59%
reference year of data and source	EIB, 2015 EC, 2015				

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.1.2.2	National interest level

Table 6: Czech Republic national interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	4-6%	5-15%	15-30%	0.45%	2.0% - Czech 10-Year Bond Yield over last 5 years
reference year of data and source	Scope Rating, 2015				CSAS, 2016

3.2 Denmark

3.2.1 Financing energy efficiency measures: Institutions, policies and goals

In Denmark, energy efficiency retrofits are normally financed by either real estate mortgages (Realkredit lån) and / or private mortgages (bank loans). Most private house owners are members of the Landowners Investment Fund (Grundejernes Investeringsfond), and can access favourable loans through it. The Landowners Investment Fund seeks to improve and better sustainability of private rental housing in Denmark. It allows private landlords to deposit savings into its GI Account and by doing so preferential loans of up to 15 million DKK are offered. This is to enable landlords to maintain and improve rental properties as well as to provide a good economic foundation. GI offers loans up to 100 % of the cost of preserving properties of certain value and for other properties loans up to 90 % of the renovation costs. On the other hand, real estate mortgages are loans secured in real property. These loans tend to be the most favourable for landlords, as interest rates tend to be lower than standard unsecured loans. Mortgage banks offer fixed-rate loans, adjustable-rate mortgages and floating-rate loans (with or without interest rate cap) as the main types of mortgage loans. All loan types are offered with interest-only periods. The typical LTV limit for a mortgage loan is 80% of the property value with an interest rate of 2.5 % over 30 years` loan term (RD, 2016). Furthermore, in recent years several banks have developed a number of energy retrofitting loans, but the interest rates on these loans are somewhat higher than mortgage loans and ranges between 5% and 7 % (Bolius, 2016).

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.2.1.1	Financing of energy efficiency investments - institutions and goals

Table 7: Denmark financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
Landowners Fund	Private fund, financed by house owners' contributions / savings for maintenance purposes. Regulated by law.	mortgage banking and philanthropy	To maintain and improve the rental housing stock	National	Max 15 mill. D.kr per project	90-100 %
Real estate loans	"Institute" (private fund), financed by private house owners contributions. Regulated by law.	mortgage banking	Profit, despite initially the aim was to help to provide housing for average income households via home-ownership	National - there are only seven institutes in Denmark today.	-	80%
Private Banking	Private/corporate banking institution	business development banking, private banking	Profit	National	-	-
reference year of data and source	Grundejernes, 2016 Mybanker, 2016 Bolius, 2016					

3.2.2 National financing practices

In Denmark, the typical LTV limit is 80% with fixed interest rate of 4.0-4.75% and variable rate of 1.3-1.75%. Financing of energy efficiency retrofits for private investors are usually via annuity loans on a 30 year basis, the yearly interest rates tend to be around 4%.

For companies, bullet loans are also available.

Similar to other EU states, banks offer an interest rate of approximately 4-6% on senior loan 5-15% on junior loan and 15-30% on mezzanine. The short term (3 months) interest rate on savings is approximately 0.75% and the long-term 10 years interest rate averages approximately 1.47%, based on the Danish government 10-Year Bond Yield over the past 5 years.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.2.2.1	National financing conditions and practices

Table 8: Denmark national financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: 30 years	Annuity and bullet loans	mortgage only mortgage or other securities other securities only	Mortgage loan fixed rate (80% LTV): 4.0-4.7% APR - Mortgage loan variable rate (80% LTV): 1.3-1.7% APR Bank loan fixed and variable rate: 0.5-15.8% APR
reference year of data and source	Grundejernes, 2016 Mybanker, 2016 Bolius, 2016				

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.2.2.2	National interest level

Table 9: Denmark national interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	4-6%	5-15%	15-30%	0.75%	1.47% - Denmark 10-Year Bond Yield over last 5 years
reference year of data and source	Scope Rating, 2015				Pengepriser, 2016

3.3 France

3.3.1 Financing energy efficiency measures: Institutions, policies and goals

In France, the policy measures regarding the green retrofit investments are decided and organised at the State level. The main financing of energy efficiency retrofits is through the ANIL (Departementale pour l'Information sur le Logement), federal or state banks and private banks. These finances are summarised in the below factsheet.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.3.1.1	Financing of energy efficiency investments - institutions and goals

Table 10: France financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
Federal Government	ANIL (National Level) then decentralized at the provincial level (Départements), as ADI.	To provide information to natural landlords which represent almost 95% of the rented private housing stock.	State policy	National		Eco loan 2014 : 31196 loans 542.7 millions € of loans 659,2 millions of building works Average eco loan: 17.398 € Average amount of works: 21.130 € 89.5% owner-occupiers. 10.5% private landlords 12.6% of the eco-loans are complemented by a market loan.
Federal Banks or States Banks	CAISSE DES DEPOTS ET CONSIGNATIONS which transforms the short term deposits of the "Livret A" in "eco-prets" (eco-loans).	To produce the eco-prêt.	State Policy	National		
Private Banking	The 20 main private banks have signed an agreement with the Caisse des Dépôts and distribute the eco-loan. These banks (BNP, Credit Agricole,) also may provide market loans to complement the eco-loan if need be.	To distribute the eco-prets.	Agreement with the French State	National	202 Mds of Euros from this sum 63% are new loans = 127 Mds of €	The eco-loans represent approximately 0.50% of the total of the new lending volume.
reference year of data and source	ANIL, 2016		Developpement-durable.gouv.fr, 2015		Banque de France, 2015	SFGGAS, 2015

3.3.2 National financing practices

In France, the most widespread financing option for energy efficiency retrofit for private landlords is the 0% interest rate on eco-loans in which the loan term is minimum between 3 years and 10 years with a possible extension to 15 years. For a private landlord, the average duration of the eco-loan is about 12 years, the average amount is 22006€ per dwelling and the corresponding eco-loan is 18914€. The typical LTV limit is 80% for private investors with an interest rate of 3.27%. The most common loan amortization is annuity for most investors and bullet for institutional investors.

In terms of loans offered, there is an interest rate of approximately 3-4% on senior loan 4, 5-9% on junior loan and the mezzanine is not used for energy efficiency retrofits. The short term (3 months) interest rate on savings is approximately 0.351% and the long-term 10 years interest rate averages 1.95%, based on the French government 10-Year Bond Yield over last 5 years.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.3.2.1	National financing conditions and practices

Table 11: France national financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed over full payoff period	Long: 10-15 years	Annuity loans for natural persons. (Fixed over full payoff period). Annuity loans for social landlords (variable interest rate / index interest rate) Bullet loans for institutional investors and profit municipal public companies (depends on the financial strategy of the company).	56.8% a security 19.6% a mortgage 23.6% other	a. Mortgage loan, fixed rate, 3.27%, 5 years, 50% for a natural landlord. b. Private corporation: Fixed rate 2.40%, 10 years, 100% but it depends on the rating of the corporation e.g. recently for a municipal public company in Lyon (SACVL) with a S&P rating A+, 100%, 1.95%, 25 years. c. Public companies, not-for profit, cooperatives: 0%, up to 15 years, 100%
reference year of data and source		SFGGAS, 2015	SFGGAS, 2015	SFGGAS, 2015	SFGGAS, 2015

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.3.2.2	National interest level

Table 12: France national interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	3-4%	4.5-9%	Not used for energy retrofitting	0.3512%	1.95% - France 10-Year Bond Yield over last 5 years
reference year of data and source	CAFPI, 2016			Euribor-rates, 2016	CAFPI, 2016

3.4 Germany

3.4.1 Financing energy efficiency measures: Institutions, policies and goals

The German funding pools have traditionally been well-equipped with extensive governmental support for efficiency improvements in existing buildings. For example, the Federal Office for Economic Affairs and Export Control (BAFA) promotes energy efficiency projects by granting federal subsidies to private households, companies and public administration. More so, the German Adaption Strategy involves a number of public and private funded measures to improve the energy efficiency of the built environment. The KfW Financing is the central tool for providing high-volume financial support for energy efficiency retrofits in Germany with the government defining the specific requirements and conditions, such as the amount of funding available and the level of discounts on interest rates. This KfW financing for energy efficiency retrofits is particularly widespread and involves low interest rates as well as a partial exemption of liability for the commercial banks implementing the actual financing. KfW has also been a founding member of the German Energy Agency (DENA) that operates as an independent company to promote energy efficiency. Their programmes foster information and motivation for consultants and owners, transparency on standards as well as the communication of best-practices. Likewise, states banks such as the L-Bank Baden-Württemberg offer energy efficiency funding loans based on the KfW promotional programme on energy efficient renovation loan. More so, dedicated private banks such as Umweltbank and ethikbank offer favourable financing schemes to its clients including loans for residential retrofits.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Factsheet 3.4.1.1	Financing of energy efficiency investments - institutions and goals

Table 13: Germany financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
Federal Government	The Federal Office for Economic Affairs and Export Control (BAFA)	promotes energy efficiency projects by granting federal subsidies to private households, companies and public administration	To provide energy efficiency improvements in existing buildings from a national targeting perspective	National	(only subsidies)	-
Federal Banks or States Banks	The KfW -government-owned development bank Federal states banks (Landesbanken): Eg L-Bank Baden-Württemberg, Sächsische Aufbau-Bank (SAB)	Loans and subsidies loan programmes based on KfW-loan eg. "Energieeffizienzfinanzierung"	To grant high-volume financial support for energy efficiency retrofits in Germany To Support and deliver energy efficiency targets of the government at state level	National State Level	€25 billion in 2015 *	66 %
Private Banking	Umweltbank ethikbank	Loans	To provide favorable terms on loans for energy refurbishment	National	Ethikbank: 19 million	-
Reference year of data and source					KfW, 2016 Ethikbank, 2016. Umweltbank, 2016. Lbank, 2016	KfW, 2016 Ethikbank, 2016)

3.4.2 National financing practices

In Germany, the KfW loans are available for up to 100 percent of investment cost, depending on the planned retrofit. The “whole house” approach attracts more generous terms than individual measures or combination of individual measures. These loans typically last for 10 to 30 years with a fixed interest rate for the first 10 years. Landlords and buyers of newly refurbished residential units, including individuals, housing companies, housing co-operatives, municipalities, district bodies, community groups, and other public or non-profit bodies, are all eligible for the loans (Power and Zulauf, 2011). The KfW loans also grant grace periods without amortisation for up to five years at the start of a loan and repayment grants up to 27.5% at the end. In terms of general interest levels in Germany, the typical LTV limit is 75% 5 year with fixed rate interest of 1.24% p.a and both annuity and bullet loans are available to investors.

German banks and institutions offer an interest rate of approximately 4-6% on senior loan 5-15% on junior loan and 15-30% on mezzanine. The short term (3 months) interest rate on savings is approximately 0.6% and the long-term 10 years interest rate averages approximately 1.4%, based on German government 10-Year Bond Yield over last 5 years. These figures are summarised by the below factsheet.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.4.2.1	National financing conditions and practices

Table 14: Germany National financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: KfW-loans(a good reference point) range between 4 to 30 years, with 10 years fixed interest	Annuity and bullet loans	Mortgage only mortgage or other securities <i>other securities only</i>	75% LTV 5 year fixed rate: 1.24% p.a.
reference year of data and source	KfW, 2016				KfW, 2016

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.4.2.2	National interest level

Table 15: Germany National interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	4-6%	5-15%	15-30%	0.60%	1.4% - Germany 10-Year Bond Yield over last 5 years
reference year of data and source	Propertyweek, 2013 Scope Rating, 2015				Bloomberg, 2016

3.5 Netherlands

3.5.1 Financing energy efficiency measures: Institutions, policies and goals

In the Netherlands, the majority of energy efficiency measures are undertaken via the RVO (Netherlands Enterprise Agency). Several subsidy schemes are available via the RVO, these are mainly to stimulate energy efficiency and to reduce CO₂ emissions in accordance with the EU2020 targets. RVO provides the ISDE, a cash allowance for private households and businesses who want to generate renewable energy. Furthermore, the STEP allowance and FEH loans are coordinated by the RVO. The STEP and FEH are provided to improve the EE performance in the rental sector. In addition to these public-sector-led models, the SVn, a combination of a public-and-private-led model, is available. The SVn provides loans from the National Energy Savings Fund, which is raised by the government, and the private banks, Rabobank and ASN Bank. The private sector itself provides several services with sustainability targets. For example, Triodos Bank rewards its clients discounts on interest rates on their mortgages depending on the energy efficiency of the property.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.5.1.1	Financing of energy efficiency investments - institutions and goals

Table 16: Netherlands Financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
National Government	<i>Non-financial institution</i> RVO	Government agencies	Public goals (follow EU 2020 targets): Mainly EE and reducing CO2 emissions	National	-	-
Banks or States Banks	-	-	-	-	-	-
Private Banking	<i>private/corporate banking institution</i>	Rabobank and ASN Bank	Mainly to increase energy efficiency and to reduce CO2 emissions	National	-	-
reference year of data and source	RVO, 2016	Rabobank and ASN Bank, 2016				

3.5.2 National financing practices

In the Netherlands, energy efficiency retrofits can be financed by either public or private funds. For example, the National Energy Savings fund offers loans of up to € 25,000 per landlord for energy savings investments such as isolation, new HE boiler, PV panels. The terms are typically 7 years fixed interest rate of 2.6%, 10 years fixed interest rate of 2.9% and 15 years fixed interest rate of 3.3%. Public financing options are also available via the Energy savings Rental sector (FEH) fund offering € 15,000 per dwelling under the following terms: Housing Corporation with dwellings under the liberalisation cap: Fixed interest rate of 0.5%. Housing Corporation with dwellings above the liberalisation cap: Fixed interest rate of 1.9%. Other corporations: Fixed interest rate of 1.9%. The typical LTV limit in Netherlands is 75% LTV with a fixed interest rate of 1.24% p.a.

Similar to the other EU states, Dutch banks and financial institutions offer an interest rate of approximately 4-6% on residential senior loan 5-15% on junior loan and 15-30% on mezzanine. The short term (3 months) interest rate on savings is approximately 0.4% and the long-term 10 years interest rate is approximately 1.64%, based on the Dutch government 10-Year Bond Yield over last 5 years.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.5.2.1	National financing conditions and practices

Table 17: Netherlands National financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Long: 7-15 years	Annuity and bullet loans	mortgage only mortgage or other securities <i>other securities only</i>	Triodos Bank Mortgage loan with IR between 1.8% and 3,8% when, LTV 65%, 1yr fixed rate period.
reference year of data and source	Moneywise, 2016 Ikinvesteers, 2016 Groenehypotheek, 2016				Triodos Bank, 2016

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.5.2.2	National interest level

Table 18: Netherlands National interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	4-6%	5-15%	15-30%	0.40%	1.64% - Netherlands 10-Year Bond Yield over last 5 years
reference year of data and source	Propertyweek, 2013 Scope Rating, 2015				Bloomberg, 2016

3.6 Poland

3.6.1 Financing energy efficiency measures: Institutions, policies and goals

In Poland, several private and national schemes offer energy efficiency financing options to different investors. The Thermo-modernization Fund (TRMF) plays the most significant role and has been administrated by the state-owned development bank since 1998. The main objective of the Fund is to provide financial assistance to investors in order to reduce energy consumption of buildings. The financial assistance is made available via two main schemes; Thermo-modernisation premium and Refurbishment premium. Thermo-modernization premium constitutes a repayment of part of a loan drawn by an investor undertaking a thermo-modernisation. The premium amounts are typically equivalent to 20% of the capital of a commercial bank loan and can neither exceed 16 % of the total investment costs nor the double amount of expected annual energy costs savings (determined in the energy audit). Refurbishment premiums, on the other hand, constitutes a repayment of part of a loan drawn by an investor for a general refurbishment. These loans tend to be about 20% of a commercial bank loan and cannot exceed 15% of the total costs of the refurbishment undertaken. Since its inception, the Fund was supplied with about 2 billion PLN. Another major programmes are available to Polish investors via the National Fund for Environmental Protection and Water Management (NFEP&WM) which was established in 1989 as a result of the regime transformation in Poland. In recent years, more than 67,000 households have received financial support under the programme for surcharges to credits for solar collectors. NFEP&WM cooperates with a system of 16 smaller voivodeship funds for environmental protection and water management (VFEP&WM) acting on a basis of subsidies from voivodeships' budgets. Based on various national funds and EU Funds country-wide operational programmes (OP) and 16 regional operational programmes (ROP) are providing financing of various activities targeting inter alia energy efficiency of residential buildings. For the programming period 2014-2010 the most relevant in this regard is the Measure 1.3 of Operational Programme Infrastructure and Environment 2014-2020 with allocation of ca. EUR 452 mln. As just one of 16 examples of ROPs the RPOWM in Mazovia province and Warsaw can be mentioned, where measures 4.1 and 4.2 of the Priority Axis IV – “The transition to a low carbon economy” (total allocation ca. EUR 324 mln) envisage support for increase of RES and energy efficiency in the public

sector and housing. Detached houses of private individuals are not envisaged in these support programmes. Several banks and financial institutions are also involved in funding energy efficiency investments in Poland. For example, products including Credit Eco Investments (BOŚ), Credit 'Energy on the plus (BOŚ) and PROSUMENT (BOŚ) are currently available. The below factsheet summarises national and local schemes offering loans and credits to Polish investors.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.6.1.1	Financing of energy efficiency investments - institutions and goals

Table 19: Poland Financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
National government	(a) TRMF run by BGK (b) NFEP&WM (c) 16VFEP&WM-s (d) OPI&E2014-2020 (e) 16 ROPs	Government agencies	Support government targets to increase energy efficiency: - reducing emissions of air pollutants - installations using renewable energy sources - thermo and associated heat recovery ventilation	Regional/state	(a) ca €40 mio annually (grant – not loan) (b) €300mln (c)unknown (d) €452mln (e) unknown	(a) 100% (b)-(e) - unknown
Private Banking	(a) Banks cooperating with Thermo fund (BGK) (b) Bank of Environmental protection (BOŚ) - Credit Eco Investments , Credit 'Energy on the plus , PROSUMENT (BOŚ), (c) Other commercial and cooperative banks	Business development banking, private banking	Profit and to diversify lending practice	National	(a) ca. € 400 mln (total) (b), (c)unknown	unknown
Reference year of data and source	bgk.pl/fundusz, 2016	Bosbank, 2016				

3.6.2 National financing practices

The various financing options identified above have different financing practices. For example, Thermo Fund offers investors up to 16% of repayment of a commercial loan financing the required investment for energy efficiency, Credit Eco Investment offers up to 15% of such a remission, Credit 'Energy on the plus' offers subsidy of up to 12% of loan (interests negotiable individually), but maximum €120k and PROSUMENT offers preferential loan co-financing between 20% and 40% of the required investment while the loan is granted at an interest rate of 1%. Similarly, the local schemes offer loans financing between 10 to 50% of the required investment to investors at an interest rate between 2.5 and 3.5%, depending on the specific scheme. National financing practices in relation to energy efficiency investments and residential loans in Poland are summarised in the below factsheet.

In the Polish residential markets interest rates of approximately 4-6% are offered on senior loans 5-15% on junior loans and 15-30% on mezzanine. The short term (3 months) interest rate on savings is approximately 0.6% and the long-term 10 years interest rate is approximately 4.1% based on the Polish government 10-Year Bond Yield over last 5 years.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.6.1.1	Financing of energy efficiency investments national financing practices

Table 20: Poland national financing practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed or variable Rate of finance varies according to the term (duration) of finance, and the loan amount.	Up to 10 years (ie short or medium) or long over 10 years	Annuity and linear loans are most common. Ballon and bullet rarely used but can be met in individual commercial agreements.	All types in use: mortgage only mortgage or other securities other securities only	Up to 95%
reference year of data and source	ECBC, 2015				DJW, 2014. ECBC, 2015

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.6.2.2	National interest level

Table 21: Poland National interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	4-6%	5-15%	15-30%	0.6%	4.1% - Poland 10-Year Bond Yield over last 5 years
reference year of data and source	Scope Rating, 2016				nbp.pl, 2016

3.7 Spain

3.7.1 Financing energy efficiency measures: Institutions, policies and goals

In Spain, the sharp fall in residential investments due to the financial crisis has deterred private retrofit investments in the rental sector. The two main programmes to promote retrofitting and energy efficiency improvements in buildings (Plan Estatal de Fomento del Alquiler de Viviendas, rehabilitación edificatoria y regeneración y renovación urbanas, 2013-2016” and program PAREER-CRECE) develop several measures to support and fund energy improvements plans. These include direct Public finance as well as private funding via agreements with private financial institutions. Specific public funds devoted to energy efficiency loans are available through ICO (Official credit Institute) and JESSICA-FIDAE Fund. While, Private financing option is available through financial institutions such as Santander and Banco de Bilbao. These institutions offer credits/loans devoted to energy efficiency projects with a discount on interest rates relative to that of the market. Currently, Green mortgages or ‘eco-hipotecas’, mortgages in which interest rates are linked to the building energy rating are also available.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.7.1.1	Financing of energy efficiency investments - institutions and goals

Table 22: Spain financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
National Government	Public/governmental banking institution	Project finance through National and Regional plans	Following national programmes and European regulations	<i>Regional/ municipal/local</i>	--	--
National Banks or State Banks	Lineas ICO Loans for rehabilitation JESSICA-FIDAE funds (IDAE)	Project finance through National and Regional plans (Following national programmes and European regulations	<i>Regional/ municipal/local</i>	--	--
Private Banking	Private Banks	Participating with private sector and public in sharing ICO available funds		<i>Regional/ municipal/local</i>		
reference year of data and source		ICO, 2016. BOE, 2013				

3.7.2 National financing practices

In Spain, private landlord can apply for any of the public sources (ICO and Jessica-Fidae) on the same conditions as firms, as well as applying for funding from banks but at market conditions. The typical LTV limit is 80% (recently fallen to 50%)³ with a variable interest rate.

Similar to the other EU states, Spanish financial institutions offer an interest rate of approximately 4-6% on residential senior loan 5-15% on junior loan and 15-30% on mezzanine. The short term (3 months) interest rate on savings is approximately 0.4% and the long-term 10 years interest rate is approximately 3.9% based on the Spanish government 10-Year Bond Yield over last 5 years.

³ 50% is the effective LTV Today; there is no mandatory LTV up to 80%. It is subjected to national credit constraints.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.7.2.1	National financing conditions and practices

Table 23: Spain national financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	variable Rate and fixed	Between 2-15 years Short-Long	Annuity and bullet loans	mortgage only mortgage or other securities <i>other securities only</i>	75% LTV 5 year fixed rate (monthly) at 2.86%.
reference year of data and source		Bank of Spain, 2016			Bank of Spain, 2016

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Fact sheet 3.7.2.2	National interest level

Table 24: Spain national interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	4-6%	5-15%	15-30%	0.4%	3.9% - Spain 10-Year Bond Yield over last 5 years
reference year of data and source	Scope Rating, 2015	Scope Rating, 2015	IDEA (2015)	Bank of Spain, 2016	Bloomberg, 2016

3.8 United Kingdom

3.8.1 Financing energy efficiency measures: Institutions, policies and goals

In the UK, in the last couple of years, there has been an increased policy focus on delivering and financing large scale take-up of effective buildings retrofit. Within this, several residential retrofit programmes have been implemented mainly via public-sector-led models focused on social

Housing or community retrofit models in which local authorities and social housing providers work closely with the private sector in delivering large-scale retrofit measures. New Barracks Estate retrofit scheme, Kirklees Warm Zone scheme and Aberdeen Heat and Power scheme are examples of residential retrofits financed via a public-sector led retrofit model. The aim of these schemes is to generate a positive social return on investment captured through energy saving, reduced CO₂ emissions as well as reduced public health costs (ARUP, 2013). Similarly, Low Carbon West Oxford and West Oxford Community Renewables are examples of community-led models in which the aim is to achieve large-scale sustainability by empowering and strengthening community networks. These community-led models use a mixture of public sector funding and bespoke financing such as local share issue. Market-based models, on the other hand, are relatively new models aiming to deliver retrofit programmes through providing new financing options such as on-bill financing for individual investors (ARUP, 2013). A good example is the UK's Green Deal market-based model (discontinued in 2015) aimed at catalysing the energy efficiency market by creating a financially attractive method for individual investors to undertake energy efficiency retrofit with no up-front costs. The idea was that through subsidies and financial incentives including loan rebates, free energy assessments and low interest rates, private investors would view residential retrofits as profitable. For instance, the Birmingham Energy Savers (BES), one of the first attempts to implement a large-scale Green Deal financed retrofit scheme in the UK, objective was to retrofit properties using an on-bill financing mechanism alongside grants and subsidies. However, to date, this market-oriented scheme has had little success. In July 2015, in light of low take-up and concerns about industry standards, the government decided it would provide no further Government funding for the Green Deal Finance Company, which provides the loans (Telegraph, 2015). Prior to this, the government provided £59 million to the company which only managed to

issue less than 10,000 green deal loans to private landlords and individual investors. The below factsheet summarises the various financing models available for energy efficiency retrofits.

Report	D 5.3: Fact Sheets regarding financing, subsidies and grant programmes
Section of report	Country section 2.1: financial institutions and financing methods
Fact sheet 3.8.1.1	Financing of energy efficiency investments - institutions and goals

Table 25: UK Financing of energy efficiency investments - institutions and goals

Variable	Type of institution	Major scope of institutions in this sector	Goals	Regional availability	Lending volume	Share of retrofitting lending volume
Public sector	Public-sector-led models New Barracks Estate retrofit scheme Kirklees Warm Zone scheme Aberdeen Heat and Power scheme The Brunswick Neighbourhood regeneration project Leeds Little London	Grants through Government Agencies	To create a positive social return on investment (SROI), including benefits captured through energy savings, business income, reduced CO2 emissions, employment creation, avoided public health costs, increased government revenue and saved maintenance time. To Improve social housing	Salford, Greater Manchester Kirklees, Yorkshire Aberdeen City, Scotland Manchester , North West Leeds, Yorkshire		
Social housing and non-financial institution	Not-for profit Community-led models Low Carbon West Oxford (LCWO) and West Oxford Community Renewables (WOCORE)	Grants through Government Agencies or share selling financing via private banking	To use the profit for empowering the community and to Strengthening community networks. To contribute to improved energy efficiency through reducing consumption and/or carbon emissions	Oxford, Southeast		
Private Banking	Market-based models targeting individuals Birmingham Energy Savers (BES), Green Deal Company Ecological Bank	on-bill financing mechanism alongside grants and subsidies on-bill financing mechanism via loans Green Mortgages and related renovation loans	To stimulate a retrofit market and to tackle fuel poverty To permit loans for energy saving measures	Birmingham and Telford, West Midlands Nation wide	£59 million	100% 10,000
reference year of data and source	Institute for Sustainability , 2013 Equitix, 2015 The Green deal Finance company, 2015 ARLA, 2013					

3.8.2 National financing practices

Many of the Low-carbon technologies such as residential retrofit measures have high up-front costs which can be recouped over time through lower running costs. In theory, these investments can provide a cost-effective way of reducing carbon emissions if individual investors have access to competitive financing options to spread the costs over a longer period (Frontier Economics, 2014). In practice, there are very little financing options available to investors in residential energy retrofit other than finances provided by high street lenders including unsecured loans, credit cards and top-up mortgages. Overall, there is no significant loan infrastructure targeted on financing energy efficiency measures. A number of banks private lenders such as the Ecological Bank offer green mortgages or loans which are secured against the property and which provide financial incentives including no arrangement fee, or a discounted interest rate for varying periods (Scottish Government, 2015).

Turning to financing practices, using the recently scrapped Green Deal financing scheme as a reference point, the durations of financing of energy efficiency tend to be over 10 years, with interest rates up to 9% APR via annuity Loan amortization. For individual investors, top-up mortgages tend to have the lowest interest rates but availability is limited to homeowners with sufficient loan-to-value (LTV). For companies, larger institutional investors and social housing investors, the financing practices tend to also involve bullet loans. LTV usually vary between 60 and 95% depending on the investor type, loan term and the interest rate charged. The below factsheet summarises financing practices in the UK.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Factsheet 3.8.2.1	National financing conditions and practices

Table 26: UK national financing conditions and practices

Variable	National interest setting	Duration of financing	Loan amortization methods	Collaterals	LTV limits or minimum equity standards
National	Fixed or variable Rate of finance varies according to the term(duration) of finance, and the loan amount.	Long: Typically 10 years and over.	Annuity for individual investors bullet for larger financial institutions and social housing investors	Mortgage only mortgage or other securities other securities only	<p>Mortgage Rates:</p> <p>(1): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling 5 year (95% LTV) fixed rate mortgage to households (in percent) not seasonally adjusted (4.96%).</p> <p>(2): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling 2 year (90% LTV) variable rate mortgage to households (in percent) not seasonally adjusted (2.89%).</p> <p>(3): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling 5 year (75% LTV) fixed rate mortgage to households (in percent) not seasonally adjusted (2.81%)</p> <p>(4): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling 10 year (75% LTV) fixed rate mortgage to households (in percent) not seasonally adjusted (3.28%)</p> <p>(5): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling 2 year variable rate mortgage (75% LTV) to households (in percent) not seasonally adjusted (1.56%)</p> <p>Personal Loan:</p> <p>(1): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling Personal loan - 5K to households (in percent) not seasonally adjusted (8.89%)</p> <p>(2): Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling Personal loan - 10K to households (in percent) not seasonally adjusted (4.29%)</p>
reference year of data and source	Bank of England, 2014	The Green Deal Finance Company, 2015. Money saving expert, 2015	Bank of England, 2014	Bank of England, 2014	HSBC, 2016

In terms of interest rate on loans, Lenders and Building Societies tend to offer an interest rate of approximately 3-5% on senior residential loans (secured by a borrower's assets pursuant to a first priority), 5-15% on junior loans (subordinated loan which ranks after other debts) and 15-30% on mezzanine loans (subordinated debt senior only to that of the common shares). Considering interest rates on deposits, for individual investors, a 3 months fixed rate interest rate is approximately 0.5-0.6% depending on the saving amount. The 10 year government bond yield is considered as the standard indicator of long-term interest rate, with a 5 year average of 2-3%.

Report	D 5.4: Fact Sheets regarding financing conditions
Section of report	Cross country comparison: financing green retrofits
Factsheet 3.8.2.2	National interest level

Table 27: UK national interest level

Variable	Interest level for residential real estate investments (senior loan)	Interest level for residential real estate investments (junior/secondary loan)	Interest level for residential real estate investments (mezzanine capital)	Interest level for savings (short time)	Interest level for savings (long time)
Private investor	3-5%	5-15%	15-30%	3 months fixed rate bond (HSBC) £2k+ 0.50% £50k+ 0.60%	2.19% - 10 year UK Government bond average over last 5 years
reference year of data and source	Propertyweek, 2013. Scope rating, 2015	Propertyweek, 2013. Scope rating, 2015	Propertyweek, 2013. Scope rating, 2015	HSBC, 2016	Data.okfn.org, 2016

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