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RentalCal Consortium

c/o IWU Institut Wohnen und Umwelt GmbH

Rheinstrasse 65

64295 Darmstadt, Germany

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# Measures and best practice approaches for reducing/removing market barriers

Deliverable

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Authors

D. Stevens; H. Adan; F. Fuerst

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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)<sup>1</sup> 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.

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<sup>1</sup> [http://www.eceee.org/policy-areas/buildings/EPBD\\_Recast/EPBD\\_recast\\_19May2010.pdf](http://www.eceee.org/policy-areas/buildings/EPBD_Recast/EPBD_recast_19May2010.pdf)

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 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 (...).<sup>2</sup>

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.

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

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 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 operation 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 1. 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).

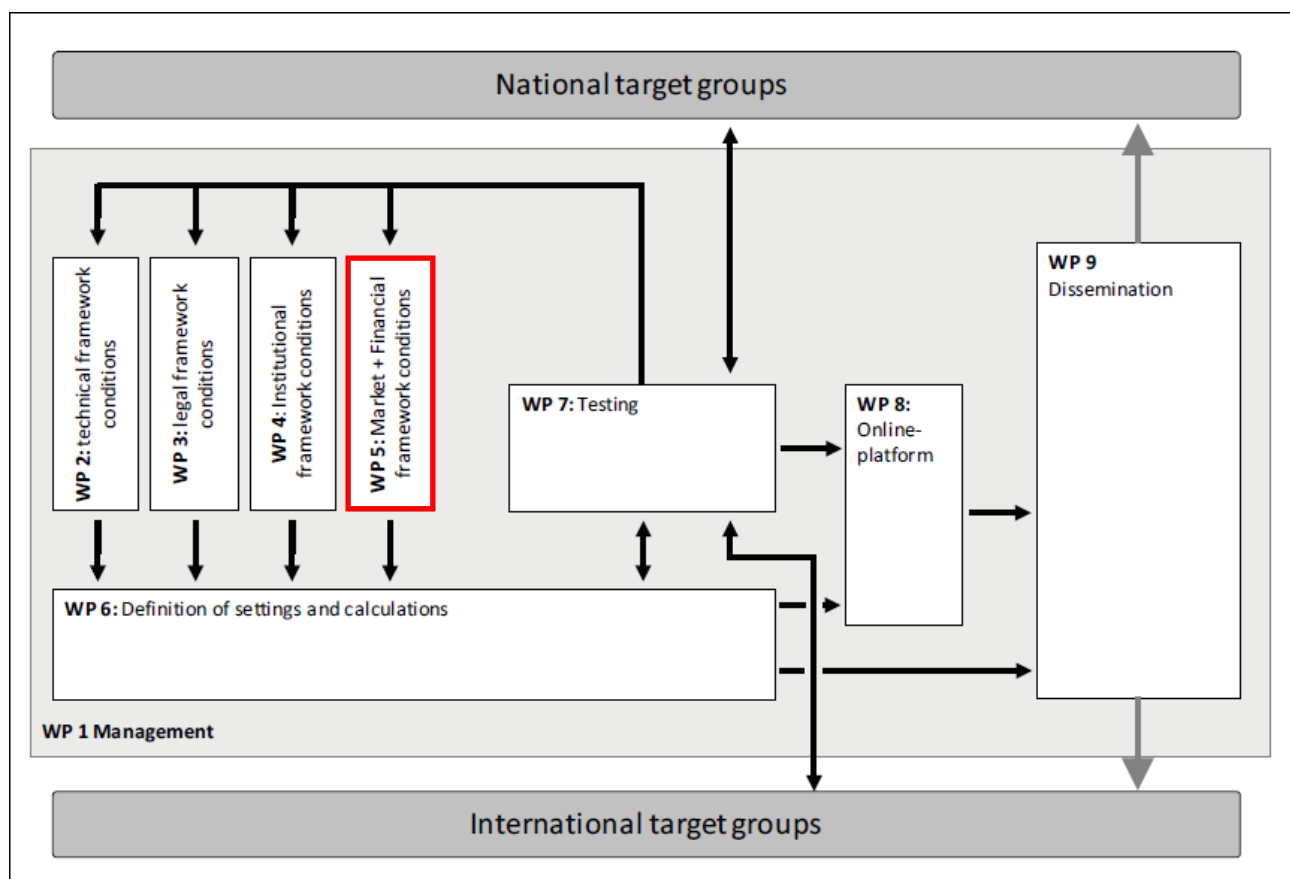


Figure 1: Work package flow chart

## **1 Overview on research efforts of deliverable 5.1**

### **1.1 Current state of research**

A report published by the Building Performance Institute Europe found that European households were accountable for an estimated 68% of total final energy use in buildings. Residential buildings account for 75% of total European building stock, from which space heating is the most common and intense consumer of energy, accounting for roughly 70% of total final energy use. The existing European housing stock is comprised of more than 40% of residential buildings built before the 1960's. During this time, there was no incentive to be aware of energy consumption, from which minimal improvements to date have been made (BPIE 2011). This part of the building stock contributes significantly to energy consumption due to their inefficiency, emphasising the importance of energy efficiency retrofits to combat climate change. Market dynamics however, are not necessarily stable over time, from which numerous factors can drive homeowner decisions. To make adjustments on how energy is consumed, there is a need to better understand the behaviour behind consumer actions, which often defy the logic behind rational economic theory (BPIE 2011). One of the main themes associated with the unwillingness to undergo retrofit initiatives relates to finance (Lewis & Smith 2013; BPIE 2011). This is not just an issue for households but also within industry. In the aftermath of the global financial crisis, funding is much harder to come by and other household demands reduce the willingness to invest in retrofitting. This unwillingness, spurs from the fact that consumer products provide personal utility and are more likely to be demanded by homeowners relative to retrofit investments (bathroom, kitchens, latest gadgets etc.). There is also the problem of financial perception, in the sense that consumers are unable to perceive future benefits in the present. This can be ascribed to high initial capital outlays of retrofit investments and the long pay-back periods associated with it (Lewis & Smith 2013) (BPIE 2011). The split incentive barrier associated with energy efficiency retrofits is both a financial and institutional barrier.

The split incentive issue originates from the fact that a property is owned by one individual but used by another. Each of these agents has different demands and therefore differing incentives based on their own perception of utility. In a tenancy agreement where the tenant pays the energy bill, the retrofit incentive lies with the tenant, but the landlord will have to provide the permission and potential funding to undergo the retrofit. It is therefore not

perceived as a benefit to the landlord. On the contrary, a tenancy agreement in which the landlord pays the energy bill, the incentive lies with him. However, he needs to get permission from the tenant to undergo the refurbishment, who might be reluctant to give consent due to the time and discomfort associated with it. Another market failure, revolving around energy efficiency retrofits, is the fact that the external cost to society is not covered by the energy end user. Energy prices are therefore not priced to support retrofit initiatives as the monthly energy bill has a marginal effect on the total monthly disposable income (due to mispricing) and therefore diminishes the incentive to save and take meaningful action (BPIE 2011). The administration and process associated with energy efficiency retrofit investments also creates issues that reduce the willingness to retrofit (Lewis & Smith 2013). From an institutional perspective, investors are more interested with the supply side initiatives relative to the smaller scale and riskier projects associated with residential energy efficiency retrofits. There is also an unequal ability of homeowners to undergo retrofits based on income and the unequal distribution of tenant age (some are pensioners and not interested) in, for example, apartment buildings. Due to low demolition rates, buildings are relatively old and energy inefficient and the landlord-tenant dilemma increase the complexity associated with upgrading the existing building stock (BPIE 2011). With property ownership commonly shared by various owners, any decisions associated with refurbishments or improvements need to be agreed by all relevant parties. However, each partner might be affected differently by the refurbishment, leading to long turnover times for decisions to be made. The lack of information (Lewis & Smith 2013) about energy retrofitting and the technologies in place, leads to a lack of awareness and increases the scepticism associated with retrofit initiatives.

This can be ascribed to the complexity of systems and the significant development in new technologies in the recent past, which is argued even to be too sophisticated for some professionals to comprehend. There is a shortage of technical know-how and few experts that can design and install low energy renovation mechanisms (BPIE 2011).

## **1.2 Central questions to be answered in D 5.1**

This deliverable compiles and compares information associated with market barriers to energy efficiency retrofits and measures to combat these barriers across eight RentalCal consortium countries. The objective of this report is focussed on providing information on

current developments in the energy efficiency market, the identification of trends associated with barriers and measures across national borders and the provision of insights for future policy considerations.

### **1.3 Procedure**

Chapter 1 contains an overview on the project, the current state of research in the field of energy efficiency and a description of the work to follow. Chapter 2 contains the results and cross country comparison fact sheets for both the barriers to energy efficiency retrofit and the existing and proposed measures to combat them.

Chapter 3 contains the individual country report sections for all eight countries; each with a comprehensive discussion of the country specific situation and their country specific fact sheets.

## 2 Results

### 2.1 Investment barriers and split incentives in the private rental housing sector

This section produces and displays the magnitude of; (i) tenant, (ii) investor, (iii) construction, (iv) institutional, (v) refurbishment process and (vi) housing stock related barriers across eight countries. The cross country comparison charts serve as a graphic representation of the cross country comparison fact sheets, which can be found at the end of this section. The severity of a specific barrier within a specific fact sheet is indicated by a categorical score which can either be; (i) low (1), (ii) low, but increasing (2), (iii) medium (3), (iv) medium, but increasing (4) or (v) high (5). This is calculated and presented for each of the barrier types.

#### 2.1.1 Tenant Related Barriers

Barriers associated with an unequal distribution of age within apartment accommodation and limited spending ability of its residence is most prominent in Spain, the United Kingdom and Denmark. Low income, as a barrier to invest in green initiatives, seems to be consistent across all of the countries. The utility and opportunity cost associated with energy efficiency refurbishments relative to other household items seems to be a significant driver behind the probability of retrofits being undertaken. This is similar with regards to the utility associated with the perceived comfort increase of green investments relative to that of new household items. There exist continuous competing forces associated with the utility gain (cost) of the retrofit and the utility gain (cost) of items that can offer immediate utility (for example a new couch). Energy efficiency retrofits are perceived as a secondary priority by tenants in the majority of the countries, with the exception of Denmark. Low energy prices, which only consume a fraction of monthly disposable income, is another major tenant orientated market barrier across the majority of countries. This is however, less of a barrier in Germany and the Czech Republic. Tenant orientated market barriers, when comparing the averages of all the countries, seems to be significant across the majority of the eight countries.

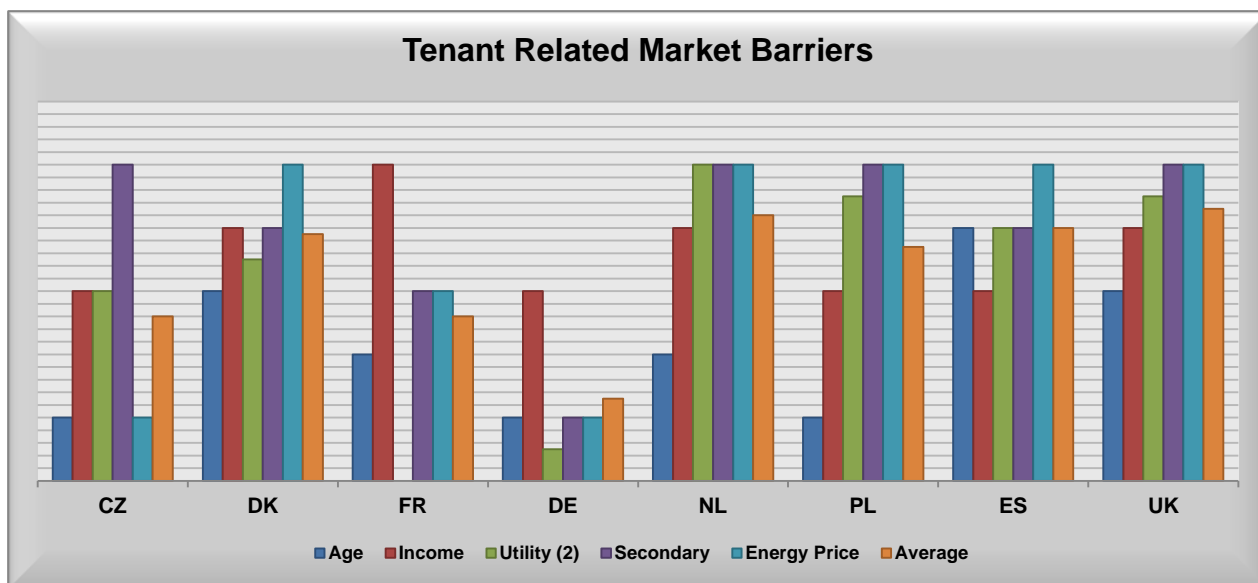


Figure 2: Cross country comparison –Tenant Oriented Market Barriers

### 2.1.2 Investor Related Barriers

Investor orientated barriers are the most prominent barrier type across all of the specified barrier categories initially specified. A common issue, which is well documented in literature, revolve around the inability of green value to be fully capitalised in property value. This barrier is consistently referred to as a significant barrier to green investment initiatives. However, it seems to be the least noticeable in the Netherlands, followed by the Czech Republic and France. Informational barriers are characterised by the lack of understanding associated with the technologies locally available as well as the lack of information available; consequently, reducing the take-up of retrofit initiatives. Informational barriers are consistently cited across all of the countries, with the exception of the Czech Republic. Probably one of the most important considerations, before investing in energy efficiency retrofits, is the cost associated with the investment. With the exception of France, high initial capital outlay is cited as significant barrier across the majority of countries. Similarly, access to financial support further reduces the likelihood of energy efficiency take-up. The demographics associated with each country also play a significant role in the likelihood of energy efficiency retrofits taking place.

In countries with high average population age, the likelihood of landlords being older and thereby less motivated to adapt to technological change and household modernisation might increase. This seems not to be a significant barrier in the Czech Republic, Denmark

and the Netherlands. However, it is evident in the remaining countries. Finally, there is a severe lack of incentive to undergo energy efficiency retrofits and is also consistently present among all of the countries. This includes the fact that the primary incentive lies on the supply side of the market. In this regard, there is more financial utility to structure and sell a financial product to finance green initiatives, relative to the perceived utility it creates for the investor.

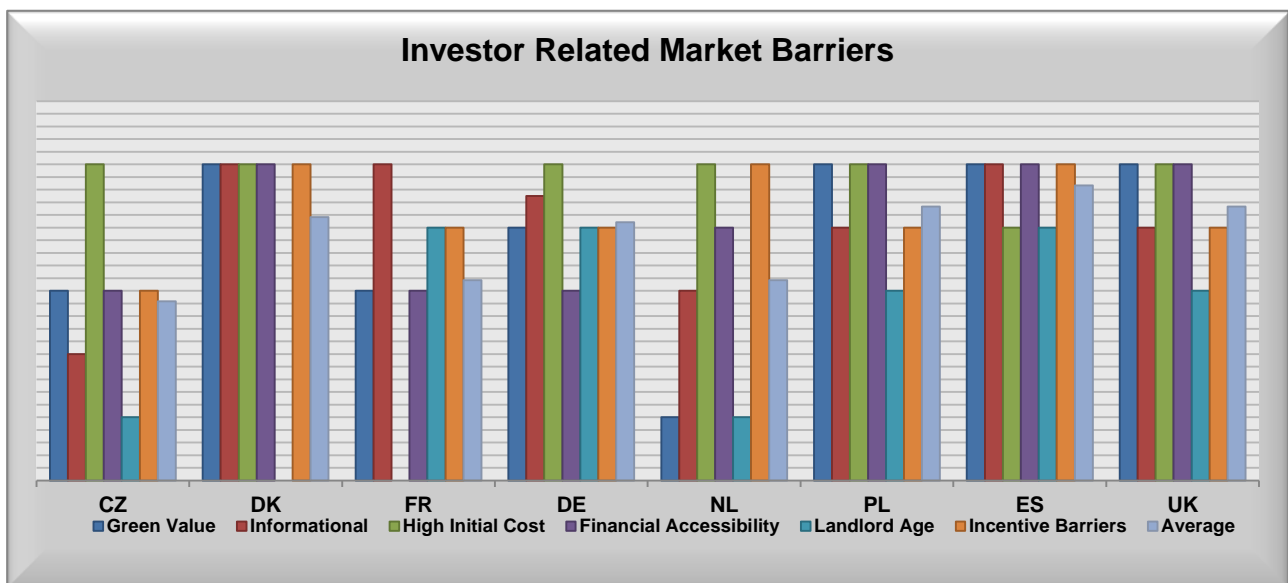


Figure 3: Cross country comparison – Investor Oriented Market Barriers

### 2.1.3 Construction Related Barriers

Construction barriers to green investments are subjected to a lack of knowledge on both the supply and receiving end of such initiatives. The refurbishment process is perceived as complex and requires specialist knowledge to fully understand. This was found to be a moderate barrier across all countries. Similarly, the lack of technological know-how on the limited supply of refurbishment initiatives available further dampens the incentive to undergo energy efficiency retrofits. This barrier was also indicated to be significant in the majority of the countries.

The remaining two barriers, grouped under construction orientated barriers, relate to one another. Firstly, there exists a slow supply of construction materials and consequently a lack of capacity in the construction industry. Secondly, and in relation to limited supply, there is a lack of competition between service providers and therefore no incentive by suppliers to reduce prices of offering the service at affordable prices. The magnitude of



this barrier seems to be moderately cited across the countries however, most significantly in Spain and the UK.

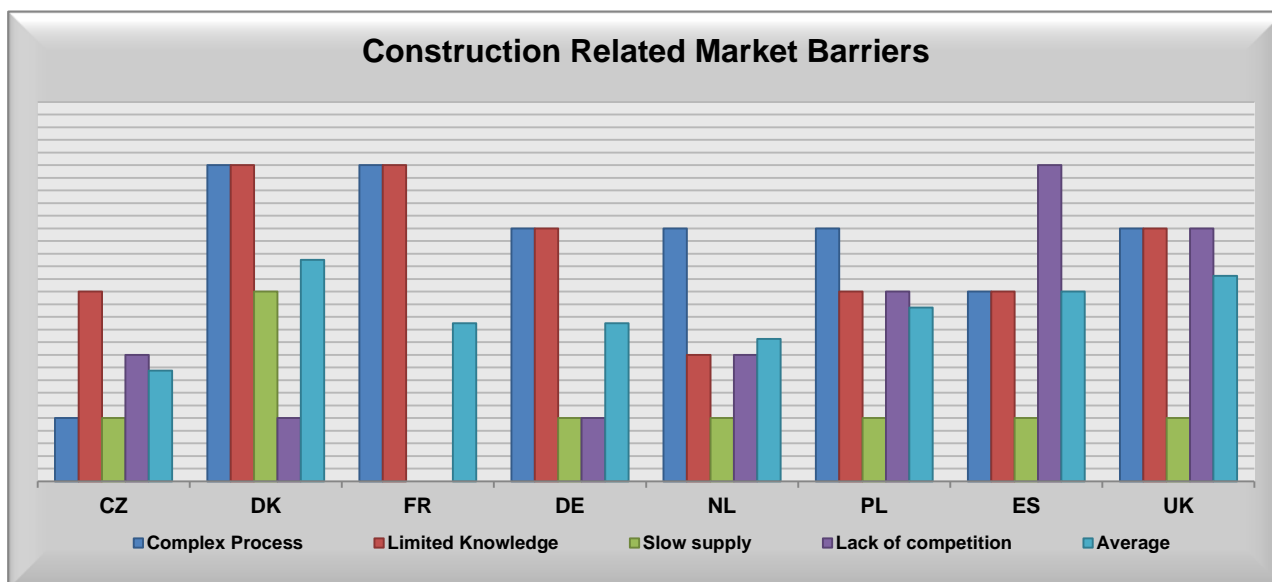


Figure 4: Cross country comparison – Construction Oriented Market Barriers

#### 2.1.4 Institutional Barriers

A well-documented barrier in green investment literature is the mismatch between consumption and payments of energy. In this regard, tenants' energy bills do not reflect their actual energy consumption. There is therefore no incentive for tenants in apartment blocks to change their energy consumption behaviour to save energy, which would be the case if individual apartment metering was in place. This barrier is most prominent in Denmark (though change of legislation by the end of 2016) and Spain. There is also the issue of cost sharing of energy efficiency retrofits mostly indicated as a significant barrier in Denmark, France and the Netherlands. The role of institutions and government also revolve around the establishment of trust and thereby initiatives to support energy efficiency retrofits. However, this seems to be a significant barrier in the UK, France and Poland, with a moderate indication of the issue in Spain. The process to undergo energy efficiency retrofits are therefore accompanied by a higher perceived cost and thereby further reduce the likelihood of green investment take-ups.

The communication process is an integral part of establishing trust and customer satisfaction in any industry. Yet, this is cited as a significant institutional barrier in the Netherlands,

Poland, Spain and the UK. The lack of communication further reduces the level of trust and a clear understanding of future plans initialised by government institutions.

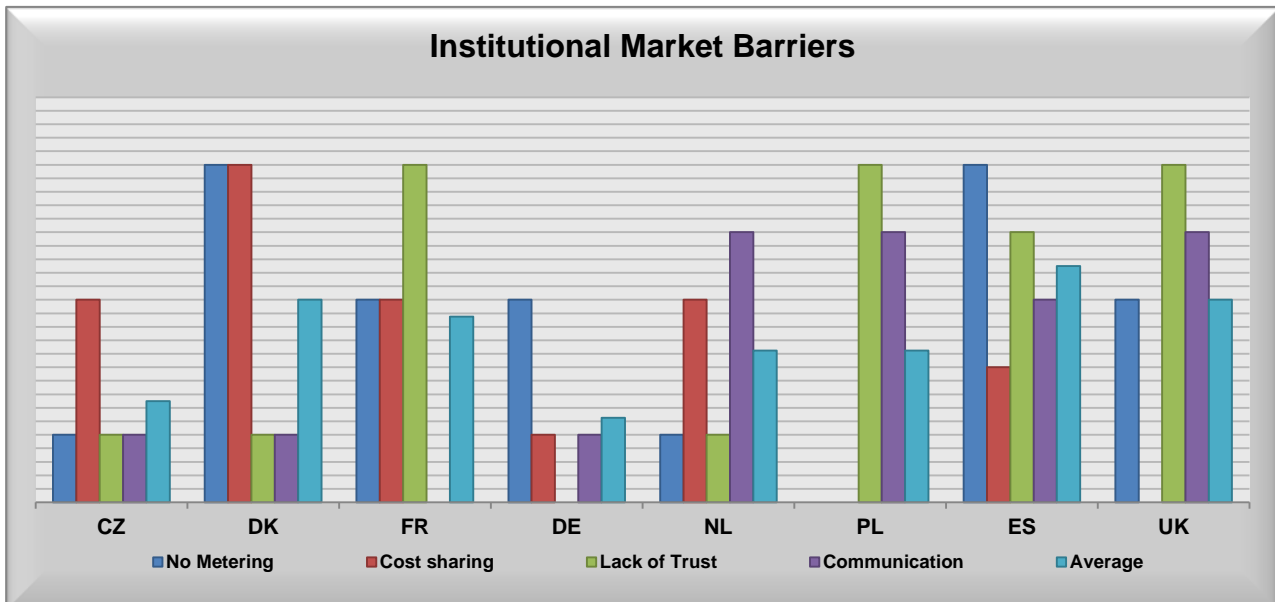


Figure 5: Cross country comparison – Institutional Market Barriers

### 2.1.5 Refurbishment Process Barriers

Energy efficiency retrofits are commonly associated with a long and unattractive process, which increase transaction costs of the initiative. This is highlighted by the majority of countries, with the exception of the Czech Republic. Similarly, the perceived cost of time and convenience further aggravates the negative perception of energy efficiency retrofits, as the only available time to undergo retrofits are during holidays.

In addition, the retrofit process creates reduced living quality and usually involves very costly compensation. Both these barriers are significant, with the exception of France and Poland for the former and Denmark for the latter. The process also increases with complexity when apartment block refurbishments are planned. In this regard there is the issue of mutual consent to be provided by all of the shared tenants before the process can start, from which disagreement cause significant delays. The magnitude of this barrier is significant in all of the countries.

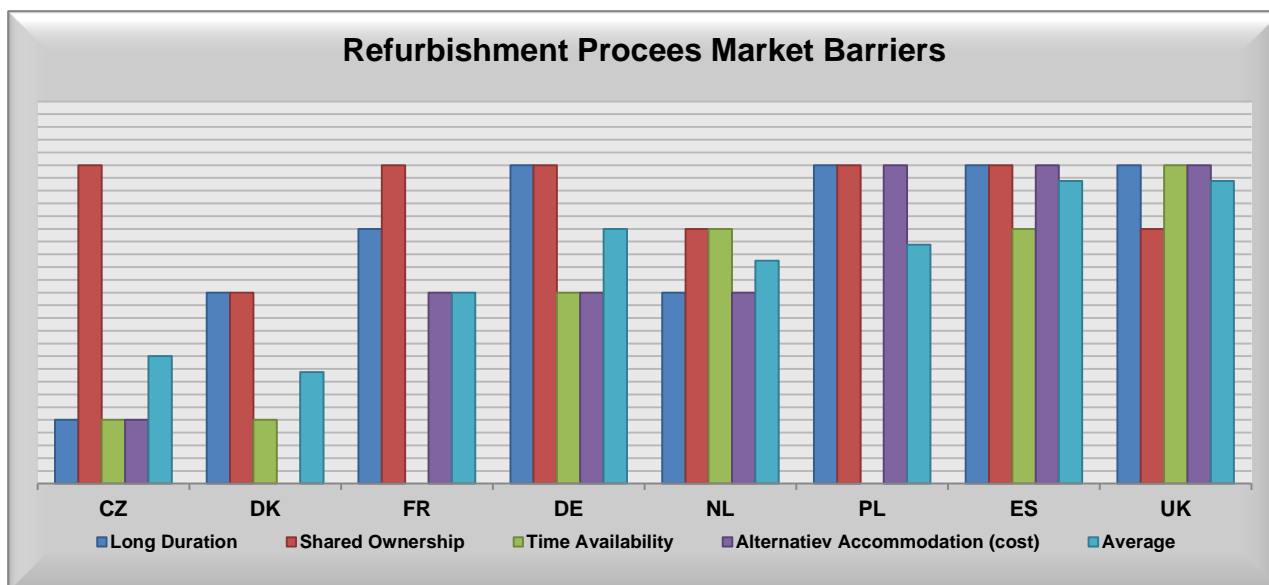
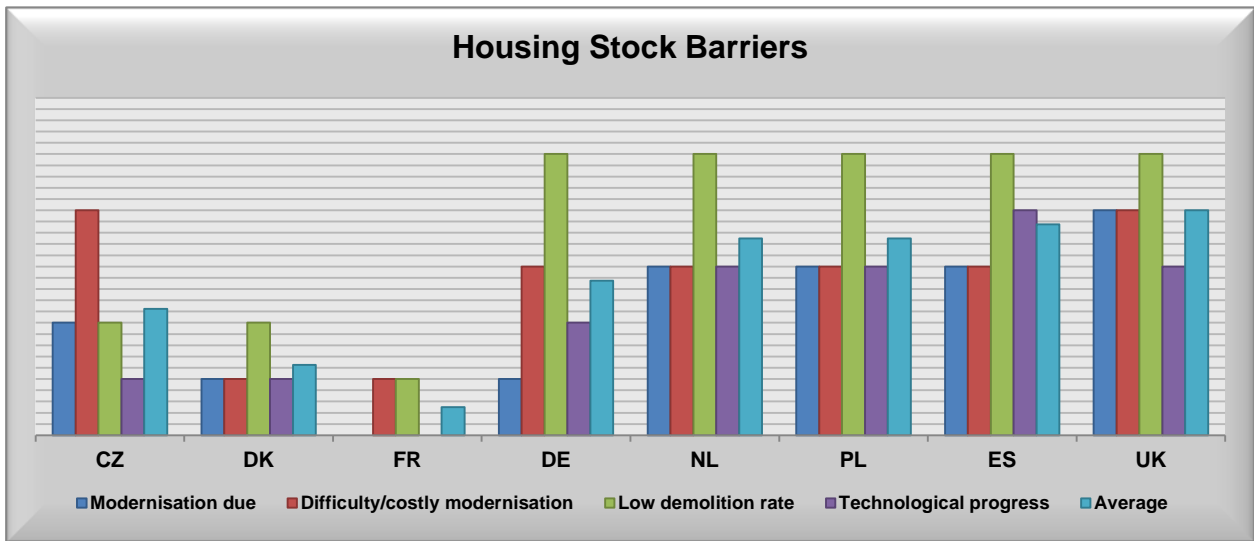


Figure 6: Cross country comparison – Refurbishment Process Barriers

### 2.1.6 Housing Stock Related Barriers

The cost and complexity of modernising the national housing stock is moderately cited across the countries as a significant barrier, with the exception of France. This arises due to the majority of the national housing stock not due for modernisation. Low demolition rates, relative to new modern developments, is indicated as the primary housing stock related barrier in the majority of countries and the national housing stock therefore remains old and energy inefficient. The lack of technological progress, in the provision of energy efficiency retrofits, further hampers the take-up of green investment initiatives and thereby further postpones national modernisation activities. This is prominent in the majority of the countries, with the exception of France.



**Figure 7: Cross country comparison – Housing Stock Barriers**

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Comparison of national tenant related market barriers

**Table 1: Cross country comparison of national tenant related market barriers**

Variable	Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	income too low to pay modernisation costs or higher rents	Less utility associated with energy savings relative to other household purchases/ items.	Less utility associated with comfort increases relative to other household purchases/ items.	Retrofits perceived as secondary priority to households	Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	Remarks
<b>Czech Republic</b>	low	medium	medium	medium	high	low	-
<b>Denmark</b>	medium	medium and increasing	medium	medium and increasing	medium and increasing	high	
<b>France</b>	low, but increasing	high	-	-	medium	medium	-
<b>Germany</b>	low	medium	-	low	Low/	low	-
<b>Netherlands</b>	low/medium	medium and increasing	high	high	High	high	-
<b>Poland</b>	low	medium	medium and increasing	high	high	high	-
<b>Spain</b>	medium and increasing	medium and increasing	medium and increasing	medium and increasing	medium and increasing	high	-
<b>United Kingdom</b>	medium	medium and increasing	medium and increasing	high	high	high	-

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Comparison of national investor related market barriers

**Table 2: Cross country comparison of national investor related market barriers**

Variable	The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	Limited understanding of the options and technologies available for energy efficiency retrofits	Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	Large up-front cost for retrofits reduces perceived affordability/increases profitability risk	Insufficient access to capital: credit constraints or insufficient equity capital available	Limited ability/willingness to adapt to technological change, because landlords are too old	No incentive to consider retrofit investments.	Investor interest lies in the supply side initiatives – less risky than residential retrofit projects	Remarks
<b>Czech Republic</b>	medium	medium	low	high	medium	low	medium	high	CZ investors (especially small private) are more focused (skeptical) on the payback period relative to the increase in value of the assets. This is a substantial barrier.
<b>Denmark</b>	high	high	high	high	high	-	high	medium and increasing	-
<b>France</b>	medium	high	high	none	medium	medium and increasing	medium and increasing	medium and increasing	Low interest rates encourage a speculative bubble (supply side) in the housing sector
<b>Germany</b>	medium and increasing	high	medium and increasing	high	medium	medium and increasing	medium and increasing	medium and increasing	-
<b>Netherlands</b>	low	medium	medium	high	medium and increasing	low	high	medium and increasing	-
<b>Poland</b>	high	medium and increasing	medium and increasing	high	high	medium	medium and increasing	medium and increasing	-
<b>Spain</b>	high	high	high	medium and increasing	high	medium and increasing	high	medium and increasing	-
<b>United Kingdom</b>	high	medium and increasing	medium and increasing	high	high	medium	medium and increasing	High	-

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Relevance of construction industry and consultant related market barriers

**Table 3: Cross country comparison of construction industry and consultant related market barriers**

Variable	Processes and options available are perceived as specialist and complex.	Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	Slow supply of construction materials and or lack of capacities in the building industry	The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	Remarks
Czech Republic	low	medium	low	low, but increasing	-
Denmark	high	medium	low	low	-
France	high	high	-	-	-
Germany	medium and increasing	medium and increasing	low	low	-
Netherlands	medium and increasing	low, but increasing	low	low, but increasing	-
Poland	medium and increasing	medium	low	medium	-
Spain	medium	medium	low	high	-
United Kingdom	medium and increasing	medium and increasing	low	medium and increasing	-

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Relevance of institutional market barriers

**Table 4: Cross country comparison of institutional market barriers**

Variable	Tenants' energy payments are not sufficiently based on individual consumption, e.g. no metering	Rent increases or modernisation cost sharing not possible	Higher perceived investment due to insecure government programmes that do not deliver	Lack of clear understanding and communication of future plans and outlook by government reduces confidence	Remarks
Czech Republic	low	medium	low	low	-
Denmark	High, but decreasing	high	low	low	-
France	medium	medium	high	-	-
Germany	medium	low	-	low	-
Netherlands	low	medium	low	medium and increasing	-
Poland	-	-	high	medium and increasing	-
Spain	high	low and increasing	medium and increasing	medium	-
United Kingdom	medium	-	high	medium and increasing	-



<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Relevance of refurbishment process barriers

**Table 5: Cross country comparison of refurbishment process barriers**

Variable	Long unattractive process reduces retrofit incentive, transaction costs too high	Shared ownership of buildings increases complexity and time of making retrofit investment decision.	Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	Costly compensation for tenants reduced living quality/ temporary unavailable dwelling units	Remarks
Czech Republic	low	high	low	low	-
Denmark	medium	medium	low	-	-
France	medium and increasing	high	-	medium	-
Germany	high	high	medium	medium	-
Netherlands	medium	medium and increasing	medium and increasing	medium	-
Poland	high	high	-	high	-
Spain	high	high	medium and increasing	high	-
United Kingdom	high	medium and increasing	high	high	-

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Relevance of housing stock related barriers

**Table 6: Cross country comparison of housing stock related barriers**

Variable	Majority of the housing stock not due to modernisation	Majority of the housing stock difficult/extremely costly to modernise	Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Technological progress awards postponing modernisation activities	Remarks
Czech Republic	low, but increasing	medium and increasing	low, but increasing	low	-
Denmark	low	low	low but increasing	low	-
France	-	low	low	-	-
Germany	low	medium	high	low and increasing	-
Netherlands	medium	medium	high	medium	-
Poland	medium	medium	high	medium	-
Spain	medium	medium	high	medium and increasing	-
United Kingdom	medium and increasing	medium and increasing	high	medium	-

## **2.2 Existing measures and innovative approaches to reduce investment barriers**

### **2.2.1 Czech Republic**

There exists numerous tenant and investor related policies in the Czech Republic. State social support is available in the form of housing allowance. This is regulated by the Law 117/1995 Coll, and provides housing allowance for social rents. The new Civil Code, law number 89/2012 states that an increase in rent of 10% will only be allowed if the value of the apartment has significantly increased. If the tenants disagree the landlord may only increase the rent up to 3.5% of the aforementioned annual expense. The New Green Savings Scheme (*Nova Zelena Usporam*) is an extensive national programme that provides support and grants for energy saving measures (State Environmental Fund of the Czech Republic 2016). Other government regulation, in support of green savings include the law 284/2011 Coll, as well as law number 268/2012 Coll. and 78/2016 Coll. Finally, the 2014-2020 Operational Programme Environment (OPE) aims to support and protect high living environmental quality for the Czech Republic population and the promotion of efficient national resource use to mitigate climate change. Currently, and in conjunction with the legislative policies in the Czech Republic, existing measures to combat the barriers to energy efficiency refurbishments include; (i) the availability of state grants and support for building renovation; (ii) the availability of specialized loans from banks and (iii) the obligation by landlords or homeowners to include the energy label when advertising lettable flats or apartments. From a landlord perspective, the new civil code includes the provision that an increase in rent, associated with increased energy efficiency of a dwelling, can be established either by mutual agreement between the landlord and the tenant or via court proceedings. There is also legislation in place which regulate the decision making process for shared ownership. Bonus state subsidies can be realized by combining energy efficiency measures in apartment buildings and family housing (Nieboer et al. 2011). Further measures include the combination of complete renovations with state subsidy schemes, increasing energy prices and the availability of low interest rate loans to finance thermal renovation.

Finally, further financial support from the public can be facilitated with a more progressive establishment of minimum energy standards for new buildings, but at a cost-optimal level. Measures that combat barriers associated with the refurbishment process in the Czech

Republic include energy efficiency programmes that incorporate a long term outlook towards at least 2020 whilst at the same time provide sustainable funding alternatives and support. This will ensure that the trust of property owners is kept intact. Combined with the continuous provision of green line information services via official websites and newsletters, this could have a positive effect on the administrative barrier, thereby reducing the complexity and turnover time of future applications. Finally, research and development programmes will support green innovations and hold the key towards energy saving and reducing the costs associated with the implementation of energy saving measures (MPO, 2014).

### **2.2.2 Denmark**

In Denmark, the new *Boligjobordningen* scheme allows the deduction of costs associated with home improvements from tax payments. Another legislative mechanism, in support of bridging barriers to energy efficiency retrofits in Denmark, is mandatory energy label provision when selling and letting buildings. The Urban Renewal Act of 2005 allows municipalities are also able to apply for support of urban renewal projects in degenerated neighbourhoods and modern areas that has social challenges (Immigration Integration and Housing Ministry 2016). The currently existing measures, to combat the barriers to energy efficiency retrofits in Denmark, revolve around the deduction of craft service labour (to a maximum of 12 000 kr.) for energy improvements from tax payments and the provision of energy saving guarantees for large buildings. Regulatory measures in Denmark include the landlord having the right to increase the rent, in any rented house, equivalent to the reduction in the energy bill caused by a given investment in energy conservation. The government has also initiated an energy advisory education and the certification of consultants via the Better Homes initiative.

### **2.2.3 France**

The law on energy transition to green growth (*Loi de transition énergétique*) states that individual meters for water and heating will be mandatory in France from January 2017 (*Loi de transition énergétique* 2014). Specific to multi-family buildings, the law enables France to more effectively combat climate change. On the 23<sup>rd</sup> of November 2009, voted French law (Decree n° 2009-1438) confirmed that energy savings realised from improved

energy efficiency will be equally shared between the tenant and landlord. In support of energy efficiency improvements and combating financial barriers, a zero interest eco-loan (Ministère du Logement et de L'habitat Durable 2016a) is available for a loan up to 30 000 EUR for household energy efficiency improvements. This is the same for co-ownership. In addition to the available finance (eco-prest), tax incentives, in the form of a reduced VAT rate and tax deductions, further combats financial barriers in France. Owners are also able to obtain a financial bonus after improving properties to classes C or D according to the former EPD. Further measures to combat barriers to energy efficiency retrofits include the establishment of a territorial platform (*Plateforme territoriale de Rénovation Énergétique de l'Habitat Privé*) for energy renovation of the private housing stock in France. The platform operates as a point of contact for private homeowners and is aimed at supporting them throughout their energy renovation projects. There will be a deployment of 600 platforms (points of contact) all over the French territory. Further regulatory measures include the law *Plan de Rénovation Énergétique de l'Habitat* voted in 2013 (ADEME 2014), which established a minimum standard of positive energy buildings for all new developments by 2020 in France (Ministère du Logement et de L'habitat Durable 2016b). Individual meters for water and heating will be obligatory in multi-family buildings from January 2017 to measure consumption behaviour as proposed by the Loi de transition énergétique (2014).

#### **2.2.4 Germany**

Germany follows a three-pillar approach comprised of (i) a legal framework, (ii) subsidy programmes and (iii) information, advice & support. This is considered a stable and attractive approach to account for market-related barriers or reservations of investors (Power & Zulauf 2011). With the objective to encourage cost reductions resulting from improved green efficiency, the Renewable Energy Act was designed to boost renewable energy strategies in Germany. This is also combined with fuel/energy taxes (cf. Energie-StG) associated with the sale of energy. The German Energy Savings Regulation (EnEV 2016) established mandatory energy standards for both residential and non-residential buildings. Mandatory metering, to accurately measure consumption, also exist in Germany (cf. HeizkostenV = heating costs ordinance). The regulatory framework in Germany also addresses the split incentive problem (user-investor dilemma) by the approval of rent increases according to BGB (civil code). Financial support is available in Germany in the form of subsi-

dies and grants (BAFA 2014) to promote the use of renewable energies. In addition, favourable loans are available from the KfW who works with commercial banks to close green financing gaps (KfW 2016). The 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, training of experts, transparency on standards as well as the communication of best-practice examples. Further measures to combat information barriers to energy efficiency retrofits include both information campaigns and subsidies for energy consulting (BAFA 2014). Collaboration with stakeholders and improving awareness within different interest groups and across the population is also proposed.

### **2.2.5 The Netherlands**

There exists a housing allowance for social rents in the Netherlands with a maximum rent cap of €710,63. Other national measures and policies, to combat barriers to energy efficiency, include mandatory energy label representation (EPC) to support the green value internalisation of energy efficient homes.

Thinking in total housing cost rather than rent expenses to create the opportunity to compensate higher rents with lower energy bills. The incentive to undergo energy efficiency retrofits can be increased by sustaining an updated information supply, financial support initiatives and an increase in regulatory stringency. Further regulation should take the form of price incentives, where higher energy prices and fuel tax increase the financial incentive for retrofit investments in the long run (Cohen & Winn 2007). Innovative approaches, to overcome information barriers, revolve around the active promotion and communication of energy efficiency experiences, and stakeholder driven information sharing, to ensure continuous information flow and best practice. The effect can be enhanced if communication is combined with community projects and social promotion campaigns that also include the communication of long term national agendas. A more public approach to bridge barriers includes regulation that enforces ending market failures (Cohen & Winn 2007). Addressing these market failures would be a major step in making a competitive environment for alternative renewable energy sources. Finally, mandatory metering for each apartment in apartment blocks is also in place to measure real consumption behaviour. Financial incentives should also be in place to enhance the attractiveness of these initiatives.

## **2.2.6 Poland**

There currently exist country wide (Infrastructure and Environment 2014-2020) and regional operational programmes that support multifamily building refurbishment in Poland. Individual measurement devices are required for the most subsidised energy efficiency schemes. There also exists obligatory EPC representation of properties (MPO 2014). Further regulatory related approaches propose government enforcement of national minimum standards. In this regard, ignoring energy efficiency certification needs to be subjected to significant penalisation. Existing tenant and investor orientated measures and innovative approaches in the country revolve around pursuing active promotion and information share of the technologies available to ensure awareness of the direct benefits of energy efficiency retrofits.

There is a need for a national programme and departmental integration as well as assurance of long term policy initiatives, thereby removing stop-go programmes and establishing trust. The establishment of one central entity for various actors will also contribute to information share in the long run. Simple plan schemes should be constructed on a list of measures rather than solely the resulting performance, thereby minimising the actual vs predicted performance risk (PwC 2010). Finally, it is important to combine support schemes aimed at technological results with those aimed at social effects.

## **2.2.7 Spain**

Energy efficiency retrofit grants (RRRU 2013) are available to support tenants and homeowners in the mitigation of climate change in Spain. The split incentive barrier, revolving around cost and green value sharing, is addressed by rent regulations that stipulates the sharing of the costs and allowances associated with green investment initiatives (LAU 2013). It is further proposed that government systems are put in place to ensure that property energy labels clearly reflect whole house characteristics and thereby enable a proper energy rating of the property. In this regard, accurate labelling will lead to a better indication of green value in order to capture how energy efficiency is capitalised into property prices. Property tax incentives (transmitted to final rents) according to better energy labels will have a positive effect in the long run. Given that no current tax incentives associated

with green energy retrofits exist, this should be a starting point to increase the incentive to undergo green retrofits<sup>3</sup>. There is however, a series of property tax incentives that will come into effect in 2016 (PGE, 2016). There do exist financial schemes directed at firms, but they are subjected to strong credit constrains in Spain (IDAE 2015). In breaching fiscal barriers to retrofit investments, easing of financial market barriers would facilitate greater credit availability to the mortgage market and therefore increase the possibility of retrofits being undertaken. Additional measures proposed revolve around information. In this regard, energy agencies should increase promotion and information share of technologies as well as exiting procedures.

Public information should be available through public documentation, which is prepared by construction and technical professionals. Education and information share is fundamental to ensure community awareness. Even though communities are fully aware of the emission reduction requirements in Spain, more information and support are required from government to combat both economic and technical barriers. Other proposed measures include directing initiatives to improve the social perception of energy saving in regional areas and the identification and communication of how to manage cost sharing and specialised programmes.

### **2.2.8 United Kingdom**

The Carbon Saving Community Obligation supports suppliers in the promotion of insulation measures in low income areas in the UK. This initiative is captured by the Energy Company Obligation (ECO Targets), which is now called ECO2 and extended to 2017 (Ofgem 2016). In 2018, a minimum standard will come into effect from which it will no longer be legal for property owners to let a property with an EPC rating lower than E in the UK (GVA 2014). This policy measure can be further strengthened by linking the EPC rating of properties to high profile measures such as taxation (Lewis & Smith 2013) and penalty charges. Government regulation remains fundamental from which stronger enforcement and incentives can take the form of (i) higher energy and fuel prices (to reflect social

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<sup>3</sup> Since 2015, only a few regions have introduced a reduction on income tax for energy efficiency investment. This measure is not common in Spain but consist of a percentage of the total investment cost to be deducted from direct taxation.



cost), (ii) stamp duty linked benefits, (iii) Income tax rebate schemes, (iv) council tax reduction (permanent or once-off), (v) the establishment of tariffs and subsidies that is fair for both energy efficiency and renewable energy initiatives and (vi) making whole house retrofits mandatory. Future policy frameworks need to deviate from short term plans and emphasise long term programmes (BPIE 2011; Lewis & Smith 2013) that will remove uncertainty for potential agents. Insurance packages coupled with customer care programmes throughout the process would already reduce the perceived risk of energy efficiency initiatives. In combatting the unwillingness of homeowners to invest in energy efficiency initiatives, it is fundamental that there is an abundance of information available to prospective homeowners.

Information creates awareness and increase knowledge which will help combat the negative perceptions associated energy efficient retrofit investments. This includes a more active approach to promoting green retrofits, by providing more information on direct benefits and new technologies. With research comes evaluation, from which it is imperative that post occupancy assessments of retrofits need to be in place, ensuring a positive feedback loop and continuous development of best practice (Lewis & Smith 2013). In conducting research, emphasis must be placed on the fact that housing stock is diverse and no one-approach-fits-all can be proposed. Further innovative measures proposed to combat tenant and investor orientated barriers revolve around the establishment of a central body that serves as a regional hub for communication and education purposes (Lewis & Smith 2013). This will be perceived as the first point of contact and create awareness during and after promotion schemes. This central body should also be local community driven to further enhance awareness. There is also a need for a national agenda in which future policy outlooks are summarised. Finally, these alternatives should be supported by continuous influence and aspiration by the establishment of minimum standards (Lewis & Smith 2013).

<b>Report</b>	D 5.1: Existing measures and innovative approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Cross country comparison: market barriers and split incentives
<b>Fact sheet name</b>	Existing policies and measures

**Table 7: Cross country comparison of existing policies and measures**

Variable	Tenant oriented policies	Investor oriented policies	Regulation/legislation oriented policies	Construction industry oriented policies	Process and transaction cost oriented policies	Building stock oriented policies	Remarks
<b>Czech Republic</b>	(i) Law 117/1995 Coll, housing allowance for social rents (ii) Civil Code 89/2012 Coll. devs 372/2001 Coll and (iii) 269/2015 Coll on individual metering and billing of heating and DHW costs.	(i) Subsidy New Green Scheme (Nová zelená úsporám). (ii) Government regulations: 284/2011 Coll. amended through 268/2012 Coll. and 78/2016 (iii) Coll 468/2012 Coll. (Panel 2013+). (iv) 2014-2020 Operational Programme Environment (OPE) Priority axis 2 (air quality).	(i) Social housing policy concept 2015-2025  (ii) Social housing law - under preparation  (iii) Energy Regulatory Office established by Law 458/2000 Coll.	(i) Subsidy New Green Scheme (Nová zelená úsporám). List of eligible Czech Contractors Directive MŽP N° 1/2014. List of approved products.  (ii) 2014-2020 Operational Programme Environment (OPE) List of approved products.	(i) State Housing Development Fund (SFRB) established by MMR through Law 211/2000 Coll.  (ii) Czech-Moravian Guarantee and Development Bank.	(i) Czech Housing Policy Concept until 2020.  (ii) Ministry of Regional Development (MMR) has administration and coordination role.  (iii) Supporting role within competence of State Housing Development Fund (SFRB).	-
<b>Denmark</b>	(i) Boligjobordningen (supports improving the energy efficiency of buildings and individual flats).  (ii) Information display of energy label (when let or sold)	(i) Green urban Renewal (Possibility to negotiate rent increase to finance energy retrofitting beyond normal rent regulation). (ii) Favorable loans & mandatory energy label by sale.	(i) Regulation of energy supply company's energy saving obligations.  (ii) Mandatory metering	(i) Funding for developing energy saving constructions and materials (prototypes)	(i) Energy advisor education and certification for consulting architects, engineers, constructing architects and craftsmen M/K (ii) Free energy consultancy by (some) municipalities	(i) Support for installation of Building Integrated PV	-
<b>France</b>	(i) Individual meters for water and heating will be mandatory (starting date 1st of January 2017) in multi-family buildings. "Loi de transition énergétique" (2014). (ii) Law 23rd of November 2009 (Decree n° 2009-1438), for sharing 50/50 the energy savings between landlord and tenants	(i) zero interest eco-loan (2011). (ii) collective zero interest eco-loan for co-ownership (2014) (iii) tax incentive (reduced VAT rate + tax deductions) (iiii) financial bonus after works if classified in classes C or D according to the former EPD (2015)	(i) Plan de rénovation énergétique de l'Habitat, Ministère du Logement, 2013, 500.000 housing units retrofitted annually by 2017 (380.000 in the private owned stock). No more buildings classified E, F or G by 2024.	(i) Label RGE mandatory for the enterprises of the building sector involved in energy retrofitting works (2014)	(i) "Unique" contact point for private owners (Plateforme territoriale de réhabilitation de l'habitat privé) where all the stakeholders are available (2014). (ii) Possibility to entrust the whole process of renovation, including financial aspects to a third party (PTRH 2014) (ii) Decision making process in co-ownership buildings; simple majority is allowed in case of energy retrofitting works (loi ALUR 2014)	(i) Plan de rénovation énergétique de l'Habitat, Ministère du Logement, 2013, 500.000 housing units retrofitted annually by 2017 (380.000 in the private owned stock). No more buildings classified E, F or G by 2024.	-
<b>Germany</b>	(i) Energy/Fuel Tax Law	(i) Subsidies and Information campaigns (BAFA 2014); (ii) Favorable Loans (KfW 2016); (iii) Obligatory efficiency (EnEV 2016)	(i) Energy Savings Ordinance (EnEV 2016); (ii) Mandatory Metering (Heating cost Ordinance)	(i) Subsidies and Information campaigns (BAFA 2014)	(i) Subsidies for energy consulting (BAFA 2014); (ii) planning and construction support (KfW 2016)	(i) Favorable Loans (KfW 2016)	-
<b>Netherlands</b>	(i) Housing allowance for social rents (below €710,63 rent cap)	(i) Mandatory energy label (EPC) to support value of EE homes; (ii) Financial support/ tax incentives; (iii) Informational Investment tool (owner-occupier perspective)	(i) Mandatory Metering	(i) Weak demand issue, subsidy schemes.	-	-	-

Variable	Tenant oriented policies	Investor oriented policies	Regulation/legislation oriented policies	Construction industry oriented policies	Process and transaction cost oriented policies	Building stock oriented policies	Remarks
Poland	(i) Individual measurement devices required in most subsidised schemes -	(i) Mandatory EPC (without sanctions, however)	(i) The Law on Energy Performance of Buildings (Dz. U. 2014, pos. 1200, 2015 pos. 151)	(i) Minimum Energy Efficiency parameters set forth for years 2016-2021 for newly constructed and for refurbished buildings (Regulation of the Minister of Infrastructure on technical conditions to be met by buildings and their location (Journal of Laws 2015, item. 1422))	-	(i) Support for multi-family residential buildings in ITI-s of main 16 cities (Infrastructure and Environment Programme 2014-2020) Support for multi-family residential buildings outside of ITI-s of main 16 cities (Regional Operational Programme 2014-2020)	-
Spain	(i) Rent Regulation for sharing costs (LAU 2013); (ii) Energy Retrofit Grants (RRRU 2013)	(i) Property Tax benefits starting in 2016 (PGE, 2016); (ii) Possibility to share costs (LAU 2013); (RRRU 2013)	(i) Regulation allows rent increases and cost sharing (LAU 2013); (ii) Energy prices are based on Public decision every year – Orden IET 2015 (BOE 2015)	(i) Retrofit should be compulsory defined by Building Engineers and Architects (RE-CE, 2013; (LOE 1999)	(i) Decision making process in share owner building is regulated (LPH 1960); (LPHR 1999) ; LAU 2013; RRRU 2013) allowing take decisions by majority of owners.	(i) The Plan de Acción 2014-2020 contains several type of grants for energy retrofitting (RRRU 2013; REE 2015)	-
United Kingdom	(i) Carbon Saving Community Obligation (Supplier support for promoting insulation measures in low income areas) – falls under ECOs (Energy Company Obligations (ECO; ECO Targets) – Now called ECO2 extended to 2017)	(i) Minimum Standards in which properties require a EPC rating of E by 1 April 2018 to be legally lettable in the UK (GVA 2014) in accordance to the Energy Act 2011.	(i) Climate Change and Sustainable Energy Act – Requires annual greenhouse gas reporting by DEFRA and provides DEFRA to impose duty on energy companies - Climate Change Act 2008 (HM Government 2008).	-	(i) Home heating cost reduction obligation (Supplier support to low income homes for home heating initiatives) (Ofgem 2016) - falls under ECOs (Energy Company Obligations (ECO; ECO Targets) – Now called ECO2 (extended to 2017)	(i) Obligation of suppliers to promote primary retrofit measures (insulation and district heating connection) under the Carbon Emissions Reduction Obligation– (Energy Company Obligations (ECO; ECO Targets)– Now called ECO2 (extended to 2017)	-
Remarks							

## 2.3 Conclusions and recommendations for policy makers

Government policy initiatives are fundamental to spark action, where well designed and targeted policy initiatives will aid problems within a national and spatial context. The consideration of national economic circumstances is fundamental for policy accuracy. These programmes need to be planned to ensure (i) that contracts are designed to guarantee that the actual energy users face the energy charges, (ii) the regulation of energy efficiency of appliances and buildings and (iii) the improvement of accessibility to information with regards to energy performance. The first step in encouraging energy efficiency by government is the reduction of uncertainty and risk associated with energy efficiency initiatives by communicating a long term price signal to the market and reducing the financial barrier of energy efficiency investment initiatives (BPIE 2011; Lewis & Smith 2013). Further, by strengthening the existing EU level legislation, a roadmap of building stock renovation should be established as well as long term binding contracts associated with monitoring and reporting plans (BPIE 2011). It is fundamental to communicate detailed and deep renovation plans, at the member state level, by clearly outlining renovation targets based on national funding and technological potential. Given the necessity for energy efficiency to be reflected in property value, the move towards building energy certification is imperative. Energy Performance Certificates are a necessary step to ensure that energy efficiency value is capitalised into property prices over the long run, which will stimulate green investment (Lewis & Smith 2013). However, to ensure investment, funding alternatives need to be in place. The establishment of an EU Deep Renovation Fund can potentially support national funding initiatives and diversify risk to ensure more flexibility to investors. Innovative financial mechanisms at the member state level can also spur more private investment, promote best practice and encourage member state cooperation (BPIE, 2011). Externalities associated energy efficiency can be addressed by adequate implementation of economic instruments that adjust the cost and benefits linked to energy efficiency measures and thereby including the social cost to society of inefficient behaviour.

Economic instruments can also aid in addressing the split incentive problem by ensuring that the benefits associated with refurbishments are also experienced by the investing agent. Alternatively, it can also be used to pass the investment cost onto the tenant that is experiencing the benefit of reduced energy bills, thereby removing the “free rider” problem.

Energy taxes and price subsidies are the two main fiscal mechanisms that can be used to directly manipulate energy prices. A fundamental step in encouraging energy efficiency however, revolves around the importance of government to remove energy subsidies as far as possible (BPIE, 2011). Energy taxes on the other hand, take many forms and can be used to reduce tax liabilities when energy efficiency improvements are made. Tax deductions and tax credits allows eligible investments to deduct energy efficiency costs from taxes payable. Similarly, tax deductions and rebates deduct the taxes associated with eligible equipment or services. Alternatively, tax relief can be used to reduce the tax payable on particular goods or by particular regions (Lewis & Smith 2013). It is usually used to correct market failures and can be used to overcome barriers to energy efficiency investments. Taxes, as a mechanism to reduce barriers and spur refurbishment incentives however, are not appropriate for low income households. This is where the government needs to introduce special programmes to aid the low income segment of the population as rising energy prices might have regressive implications. Other economic instruments include grants, loan programmes and concessional loans, guarantees and accelerated depreciation. Grants can be effective in the sense that it can bridge the financial gap towards refurbishments which would otherwise not occur. Loan programmes and lending institutions need to effectively translate the lower risk and higher returns of green investments into lower interest rates, probably representing the most significant measure to motivate energy efficiency retrofits. Similarly, concessional loans, by incorporating subsidies, can significantly reduce the cost associated with retrofit investments. Accelerated depreciation allowances are a financial measure that reduces the after tax total cost of equipment and therefore allowing purchasers to write-off the cost of depreciation.

Guarantees can serve as a measure to significantly reduce the perceived risk associated with the retrofit investment and at the same time increase the leverage of private debt finance (Hilke & Ryan 2012). In this regard, removing market barriers for Energy Savings Company (ESCOs) and establishing an innovative guarantee system will enhance confidence for consumers and investors (BPIE, 2011). The goal of these economic instruments is to kick-start private financial markets and motivating investors to fund energy efficiency measures. Long term research and development (R&D) programmes could be brought forward by government, which would ultimately provide incentives for supply driven technological development and change and lead to continuous innovation. The efficiency of

R&D should be evaluated by the number of patents filed (Lewis & Smith 2013). This will ensure continuous improvement in energy efficiency over the long run (Hilke & Ryan 2012). This can be supported by the establishment of national data collection systems, relating to energy efficiency performance, to ensure long term data availability for reliable policy making. Policy initiatives should be subjected to proper evaluation coupled with stringent enforcement. This is only possible if adequate monitoring systems of compliance are in place, managed by a high quality workforce. These systems should be led by the public sector to kick start a renovation revolution in the market, thereby reducing the costs for private households. Integration of training and education within the established systems will enhance skills in the construction industry, improving resource efficiency, environmental performance and facilitating continuous innovation of construction enterprises (Lewis & Smith 2013; BPIE 2011).

### 3 Country report section

#### 3.1 Czech Republic - Investment barriers, split incentives and policies

There are currently numerous programmes in the Czech Republic aimed towards combatting climate change by reducing greenhouse gas (GHG) emissions. The objectives include more efficient use of energy sources, improved energy efficiency of buildings and supporting residential development with good energy performance. Successful reduction of GHG emissions will lead to a reduction of specific CO<sub>2</sub> per capita emissions. This, after completion of the first reduction commitment of the Protocol (2008 - 2012) of 30 % by 2020, towards a reduction in total aggregate CO<sub>2</sub> emissions by 25 % compared to 2000 levels over the same period. It is also aimed at continuing this trend towards 2030. Further objectives include; (i) an increase in the share of renewable energy sources, consumed as primary energy sources, of 6 % by 2010 and 20 % by 2030 and (ii) a reduction in the energy intensity of production, distribution and final consumption of energy to a level of 60-70 % of current consumption by 2030 (MPO, 2014). Energy retrofit investment decisions in the Czech Republic are constantly hampered by administrative burdens from which the process is subjected to significant paperwork and a lack of knowledge in various circumstances. There are also doubts about the return on investment of green retrofits due to the uncertainty associated with the evolution of energy prices, high vacancy rates<sup>[4]</sup> and tenant insolvencies. Further barriers in the Czech Republic are associated with measures of energy efficiency services, with emphasis on Energy Performance Contracting (EPC). The Act No 218/2000 on budgetary rules prevents the use of EPC contracting methods by public authorities; not allowing these entities to undertake loans (Wardal et al. 2015). Other, non-legal barriers revolve around the complexity and stressful nature of the application process, the need for full agreement by all tenants (social housing) to these initiatives as well as insufficient budgets of housing cooperatives and municipalities (Nieboer et al. 2011).

There is also a high investment cost associated with energy saving refurbishments of buildings and is probably one of the main barriers towards the implementation of energy saving measures (MPO, 2014). There are however, initiatives in the Czech Republic that

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<sup>4</sup> This applies to regions such as North Bohemia

already provide adequate processes to combat barriers. Energy efficiency measures are closely related to refurbishment tasks of panel buildings which hold the largest potential saving in the Czech Republic through restoration, modernisations and repairs channelled through targeted subsidies. The government also provides state subsidies for renewable sources, but mainly solar power and passive house standards are supported. Bonus state subsidies can be realised by combining energy efficiency measures in apartment buildings and family housing (Nieboer et al. 2011). Further measures include the combination of complete renovations with state subsidy schemes, increasing energy prices and the availability of low interest rate loans to finance thermal renovation. With regards to EPCs, proposals have been prepared for the provision and promotion of energy services employing EPCs in the tertiary sector. This includes the promotion of energy efficiency services (EES) and EPC in private and public sectors. This also involves the provision of EPC definitions and information with regards to EES contracts and articles provided by the Energy Efficiency Directive 2012/27/EU (MPO 2014). Additional measures include the improvement of the legal framework for EPC by removing legal obstacles, utilising the funding programmes provided by the EU and improving housing regulation overall. These measures all serve the main purpose to remove legislative barriers associated with the use of EPCs and the processing methods for the preparation of EPC projects in public administration, with the main objective to ensure that EPCs become the primary method of achieving energy savings in buildings (Wardal et al. 2015). Further best practice measures will be required in the social housing sector of the Czech Republic, by which better integration and policies associated with energy efficiency management will be required to ensure control and lower cost of energy efficiency retrofits. This is especially relevant in older estates where large scale refurbishment is required (Nieboer et al. 2011).

The integration and use of building energy performance certificates to compare the quality of buildings relative to one another is still in the initial stages in the Czech Republic, which requires strengthening to ensure the future perception as an instrument of certified quality. Energy efficiency programmes should be considered with a long term outlook towards at least 2020 and provide stable funding and sustainable support. This will ensure that the trust of property owners is nurtured and sustained. Combined with the continuous provision of green line information services via official websites and newsletters, this could have a positive effect on the administrative barrier, thereby reducing the complexity and turno-



ver time of future applications. This should be supported by workshops and training sessions organised by the State Environmental Fund, Non-Governmental Organisations and financing institutions. Further financial support from the public can be facilitated with a more progressive establishment of minimum energy standards for new buildings, but at a cost-optimal level. It is also required that there is a system in place that continuously report energy savings as a means to evaluate the effectiveness of individual retrofit initiatives and create an ongoing revision to ensure best practice. Finally, research and development programmes will support green innovations and holds the key towards energy saving and reducing the costs associated with the implementation of energy saving measures (MPO, 2014).

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Czech Republic – Tenant- and investor-sided barriers and policies

**Table 8: Czech Republic – Tenant- and investor-sided barriers and policies**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Low	-	-
Income too low to pay modernisation costs or higher rents	tenant	so- cial/demographic	affordability	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Medium	State grants for building renovation are available.	-
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Medium	-	-
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Medium	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	No	High	Mandatory to include the energy label when advertising flats for rent.	-
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Medium	-	-
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	No	Medium	Mandatory to include the energy label when advertising flats for rent.	-
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack of knowledge	No	Medium	-	-
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack of knowledge	No	Low	-	-
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	No	High	-	-
insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	No	Medium	State grants for building renovation are available and specialized loans from banks.	-
limited ability/willingness to adapt to technological change, because landlords are too old	investor	so- cial/demographic	age	No	Low	-	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	No	Medium	State grants for building renovations are available and specialized loans from banks.	-
Data source and reference year	(MPO 2014; Wardal et al. 2015; Nieboer et al. 2011)	lbid.	lbid.	lbid.	lbid.	lbid.	lbid.
Remarks							

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Czech Republic - Regulation and refurbishment process issues

**Table 9: Czech Republic - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants' energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	Low	Regulation available to charge tenants for energy consumption based both in dwelling area and individual metering. Individual metering in housing blocks is mandatory.	-
Rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	Medium	The new civil code includes provisions to increase the rent in cases of modernisation, either by mutual agreement or decided by the court.	-
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	Low	-	-
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	Low	-	-
Long unattractive process reduces retrofit incentive, transaction costs too high	process-es/management	regulatory/financial	Administration & Process barriers	Low	-	-
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	process-es/management	regulatory	Shared Ownership	High	Legislation available to regulate the decision process in shared ownership.	-
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	process-es/management	other	Time Constraints	Low	-	-
Costly compensation for tenants reduce living quality/ temporary unavailable dwelling units	process-es/management	financial	construction side effects	Low	-	-
Data source and reference year	(MPO 2014; Wardal et al. 2015; Nieboer et al. 2011)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Czech Republic - Construction industry, consultants and building stock issues

**Table 10: Czech Republic - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	low		
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	Medium	Subsidy schemes require the use of certified providers and products.	-
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	Low	-	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	low, but increasing	-	-
majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	low, but increasing	-	-
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	high	Subsidy Schemes	-
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	low, but increasing	-	-
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	low, but increasing	-	-
Data source and reference year	(MPO 2014; Wardal et al. 2015; Nieboer et al. 2011)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

### **3.2 Denmark - Investment barriers, split incentives and policies**

The Danish energy policy aims to reduce heat loss from houses with 40-50% per m<sup>2</sup> before 2050. As the present heating demand in buildings is 132 kWh/m<sup>2</sup> including hot water consumption, this equals a reduction to around 78.8 kWh/m<sup>2</sup> for existing buildings before 2050 (Mathiesen et al. 2015). At the same time the m<sup>2</sup> area is supposed to increase, so that the heat demand in 2050 is just slightly lower in 2050 relative to 2015 (ENS 2011). In 2014 the Danish government agreed on a 'Strategy for energy retrofitting of buildings' (ENS 2014b). The strategy aims to promote energy savings in energy consumption for heating and hot water supply, especially focussing on the existing building stock, which accounts for about 35 per cent of the total final energy consumption in Denmark. The government expects that the initiatives within the strategy will lead to an energy consumption decrease in the existing building stock by 35 per cent in 2050 compared to current consumption levels. Upgrading of the Building Code constitutes an essential element in the strategy. It stipulates that low-energy class buildings are to become mandatory for all new constructions. In addition, a voluntary energy class for existing buildings has been introduced. Finally, there is a revision of the demands for components in the building code, including an upgrade of the requirement for windows. The strategy also provides for a strengthening of the Danish Energy Agency's information on energy conservation. The website SparEnergi.dk provides information and tools targeted building owners, builders, consultants and other stakeholders. It reveals the building's energy situation and describes the savings that can be implemented. There is also an effort to make energy labels available to building owners in a clear and understandable way, so that it is easier to get an overview of the costs for energy renovation when you purchase a home. The reduction in heat demand per m<sup>2</sup> is implemented at the same time as the heat supply is undergoing a basic restructuring process from fossil fuels to renewable energy supply and industrial heat (especially wind power based heat supply, by means of heat pumps). The heat market is, in this process of change, used as one of the ways of integrating an increasing production of wind power. When making energy savings in buildings, including rental buildings, it is important to look at this in relation to the need for integration of the large share of fluctuating wind power. So energy savings cannot be seen independently of the supply system, in which it is supposed to be embedded in the future. The energy prices determine the house

owners' incentives to energy renovate. And the possibilities of saving money are next to none, the way the energy prices are calculated today. The energy prices in Denmark consists of a fixed and a variable part, where the fixed part accounts for the largest amount in more than 90% of the energy supply companies. This has to be paid under all circumstances. So the incentives only relate to the variable part of the energy bill. The importance of this is shown by the fact that in 80 % of Danish households, heating and hot water come from a central heating system (Lund & Mathiesen 2009). A landlord has the right to increase the rent in any rented house equivalent to the reduction in the energy bill caused by a given investment in energy conservation according to "The total economy neutrality". But it means that the incentive for the landlord only exists, if the investment has a higher interest rate than the interest rate at the financial market. And this is often not the case with the present tariffs. An improvement of the comfort in the flat naturally can increase the competitiveness of a flat, where we are dealing with a surplus of flats, or where we are in a situation of renters market (Lejeloven 2016). The possibilities for obtaining public or private subsidies for energy retrofitting can take various forms. Firstly, the so called *BoligJobordning* (Residence Job scheme) Scheme of 2015-2017 allows a deduction of up to 12,000 DKK per person (18 years old or more) for craft services. This includes means for energy savings and climate adaptations to a home. This scheme is however only available for private landlords as the deductions are per person. Social housing associations act as an umbrella organisation. Secondly, 50 million Dkr has been allocated annually for "Green Urban Renewal" subsidies for rental buildings. This is roughly 150 Dkr/ 100 m<sup>2</sup> flat per year, or between 1 and 2% of the annual heat energy bill. It is possible to sell energy savings to the large energy supply companies (for a price of 0,4-0,7 Dkr / kWh), which is around 5% of the investment required for energy retrofitting (Ministry for Immigration, Integration and Housing 2016). Finally, there exist free energy consultancy alternatives, where municipalities are able to subsidise energy conservation activities. The government has initiated an energy advisor education and certification of consultants called *BetterHomes*. These advisors sell their consultation on market conditions. However, at the evaluation in 2014 (ENS 2014a), there were many complaints (The Energy Agency used 15 Million Dkr for advertising, and none for support). The main focus of *BetterHomes* is on private owners of single family houses who will have to pay between 2000 and 3.000 Dkr for a report. This is difficult to sell. A special problem that has occurred in Denmark is the

fact that it is nearly impossible to obtain a loan for energy efficiency retrofits in smaller cities and villages, as they are particularly affected by the deflations in the housing prices. Usually banks do not approve mortgages to real estate, which has a price below 500,000 Dkr and that cannot transpire within 6 months. These criteria especially affect remote areas, as a large proportion of the housing stock in these areas is within the aforementioned price limit and usually exceed six months (Muusmann 2015). In addition to the financial issues, there exist a series of technical barriers. They include limited knowledge about new technologies adjusted towards energy retrofitting and the lack of adequate manufacturers and suppliers with the technical know-how.

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Denmark – Tenant- and investor-sided barriers and policies

**Table 11: Denmark – Tenant- and investor-sided barriers and policies**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	social/demographic	age	-	Low	-	-
Income too low to pay modernisation costs or higher rents	tenant	social/demographic	affordability	Especially in small villages in rural areas, where mortgages cannot be obtained	Relevance barrier as	-	-
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	Information necessary	medium increasing and	Håndværkerfradrag	Håndværkerfradrag
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	Information necessary	medium increasing and	Håndværkerfradrag	Håndværkerfradrag
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	Information necessary	medium increasing and	Håndværkerfradrag	Håndværkerfradrag
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	Yes - due to fixed part of energy price	High	-	-
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	They are - a good thing for the owner. Documented for one family houses	High	Market driven initiatives	Market driven initiatives
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack knowledge of	Yes	High	BedreBolig - educating energy advisors	-
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack knowledge of	Yes	High	BedreBolig - educating energy advisors	-
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	Yes	High	-	-
Insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	Especially for house owners in small villages in rural areas	High	-	-
Limited ability/willingness to adapt to technological change, because landlords are too old	investor	social/demographic	age	-	-	-	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	Energy prices are too low, and there are no other (serious) incentives	High	-	-
Data source and reference year	(Mathiesen et al. 2015; Lund & Mathiesen 2009; ENS 2011; ENS 2014b; Lejeloven 2016; Immigration Integration and Housing Ministry 2016; Muusmann 2015)	ibid.	ibid.	ibid.	ibid.	ibid.	ibid.
Remarks							



<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Denmark - Regulation and refurbishment process issues

**Table 12: Denmark - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	High	Installation of electronic meters for electricity ending 2017 (ongoing)	-
Rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	High	The total economy neutrality in the Law of Renting Houses means that any landlord has the right to increase the rent in any rented house equivalent to the reduction in the energy bill caused by a given investment in energy conservation.	-
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	Low	-	-
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	Low	-	-
Long unattractive process reduces retrofit incentive, transaction costs too high	processes/management	regulatory/financial	Administration & Process barriers	Medium	-	-
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	processes/management	regulatory	Shared Ownership	Medium	-	-
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	processes/management	other	Time Constraints	Low	-	-
Costly compensation for tenants reduce living quality/ temporary unavailable dwelling units	processes/management	financial	construction side effects	-	-	-
Data source and reference year	(Mathiesen et al. 2015; Lund & Mathiesen 2009; ENS 2011; ENS 2014b; Lejeloven 2016; Immigration Integration and Housing Ministry 2016; Muusmann 2015)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Denmark - Construction industry, consultants and building stock issues

**Table 13: Denmark - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	high	-	-
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	high	-	-
slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	Low to medium	-	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	Low	-	-
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	Low	-	-
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	Low	-	-
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	Low but rising	-	-
technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	Low	-	-
<b>Data source and reference year</b>	(Mathiesen et al. 2015; Lund & Mathiesen 2009; ENS 2011; ENS 2014b; Lejeloven 2016; Immigration Integration and Housing Ministry 2016; Muusmann 2015)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
<b>Remarks</b>						

### 3.3 France - Investment barriers, split incentives and policies

In France, energy savings associated with buildings is a main priority, as it represents roughly 40% of final energy consumption in the country and almost 25% of CO<sub>2</sub> emissions, emphasising the importance of managing energy demand of both existing and new building stock (Ministry of Ecology, Sustainable Development and Energy 2015). France also has defined ambitious energy efficiency objectives that include both a 20% reduction of CO<sub>2</sub> emissions and energy consumption by 2020. Further objectives are associated with the housing sector. The law, *Plan de Rénovation Énergétique de l'Habitat* (PREH), voted in 2013 and completed by the law on the energy transition (*Loi de transition énergétique 2014*) voted on the thirteen of August 2015 stipulates; (i) a total of 500 000 housing units to be retrofitted annually (120.000 in the social housing stock, 380.000 in the private owned stock) , (ii) the establishment of a minimum standard of positive energy buildings for all new developments by 2020 and (iii) the average energy performance of the overall housing stock to equate to 80 kwhep/m<sup>2</sup>/year, which is currently the average standard for the new constructions (Ministère du Logement et de L'habitat Durable 2016b). For these objectives to be met there are three main requirements. Firstly, new developments need to be regulated (Réglementation thermique 2012 - RT2012). Secondly, special financing condition's is required for existing housing stock, with the conditions of these special loans, the *Eco-prêt* aimed towards improving buildings that has poor EPC rating (E, F, G) to a more energy efficient rating (A, B, C, D). Finally, the availability of a special VAT rate for energy retrofitting; (i) 5.5% rather than 10% renovation costs or (ii) 20% construction costs for new buildings. These functions also serve as measures to enhance the movement towards more efficient energy use. The main market barriers originate from the fact that 95% of the private rented stock is owned directly or indirectly by natural persons and almost 60% of tenants stay less than 5 years in the same dwelling, indicating significant tenancy turnover and mobility in the country (Bosvieux 2012). Due to national policies implemented in the 1990's, tax incentives were used to develop privately rented stock, from which types I and II rooms are now overrepresented in the private rental market. Further barriers to take action towards energy saving measures include; (i) the lack of information and energy saving measures, (ii) lack of incentive, emphasising inconvenience and a lack of time, (iii) affordability issues and (iv) the continuous change in French policy. The country also has a feed-in-tariff scheme for microgeneration technologies such as so-

lar photovoltaics, but it is not linked to programmes or policies designed to improve energy efficiency (Fawcett et al. 2013). The country is also subjected to a lack of knowledge and manufacturers on new energy efficiency technologies with real know how, as well as minimal research and demonstration projects dealing with sustainable development approaches. With the structure of energy prices, it is difficult to reduce the fixed subscription part of the energy network cost. There is also no consideration of the potential evolution in energy prices over time. Energy prices are also generally low in France reducing the incentive to wards saving, emphasising the importance of including the external cost in energy prices. Finally, there is also a need to account for the variation in the occupant's energy consumption behaviour to ensure an energy performance standard (Outrequin et al. 2008) as a consequence of the European legislation individual metering. The availability of the zero-interest eco loan for natural landlords (0%, up to 15 years, max amount 30.000 euros) is the main initiative that has proved to combat the barriers to undertake energy saving retrofits. The system is viewed as a mechanism for up-selling, as additional services is available to the consumer free of charge. This availability of finance supports low-carbon refurbishments in the sense that it is no longer perceived by contractors as a barrier to overcome but rather an opportunity to be taken. The need to understand the behaviour variation of occupant energy consumption behaviour is generally recognised by industry however, French policy automatically avoids this source of uncertainty and complexity by rewarding physical installation (Fawcett et al. 2013). Regarding this relation with the tenants, the law voted on the 23rd of November 2009 (Decree n° 2009-1438), allows the landlord to share half of the energy savings with the tenant, after an agreement by both parties has been established.

Consequently, 50 % of the annual energy savings could be invoiced to the tenant with a special line mentioned on the rent receipt. This sharing might take the form of a monthly lump sum, depending on the number of rooms of the dwelling, by private natural landlords owning a few dwellings. This last opportunity, by charging the tenant, does not work in the private rental market as it presupposes a preliminary agreement between the parties. Roughly 95% of the private landlords are natural persons. Among this 95%, 80% own an average between 1 and 2 dwellings mainly consisting in types I and II. Private landlords also have a poor social competence to negotiate any increase in rent with their tenants. The tenants' high mobility rate, also do not create any incentive to equally share the ener-

gy savings. The second most important barrier, attached with this structure of ownership, is related to the fact that 70% of the aforementioned 95% is located in multi-family buildings mixed with owner-occupiers in co-ownership lots. It creates a high level of complexity to renovate, especially in large urban estates. This complexity was underestimated by the French government from which three important political measures have been taken in 2013 and 2014:

- i). Starting from the 1<sup>st</sup> of January 2014 up to the 31<sup>st</sup> December 2018, the creation and availability of a collective eco-loan PTZ for the renovation of buildings in co-ownership lots. This loan has to be subscribed by the association of co-owners which includes the private landlords in its membership.
- ii). In 2014, the French Government has voted a new law which creates at the administrative level of the EPCI (*Etablissement Public de Cooperation Intercommunale*), administrative level cooperation between municipalities via a territorial platform for the energy renovation of the private housing stock (Plateforme territoriale de Rénovation Energétique de l'Habitat Privé). The platform aims specifically at supporting private owners including private landlords in their project of energy renovation. The platform operates as a unique (guichet) point of contact for the natural private owners with the objective(s);
  - a. Mobilising public and private stakeholders, which include; (i) designers and building companies, (ii) banks distributing the eco-loan and the other sources of financing, (iii) local public authorities which provides information about the fiscal aspects and subsidies and (iv) property agents and managing firm; from a unique point of contact.
  - b. Reducing private owners' acting-out by enabling the private owner, or association of co-owners, to entrust the project to the territorial platform, that will be in charge of the entire process.

The professionals of the building sector are coordinated and their qualification guaranteed. The label R.G.E. (*Reconnu Garant de l'Environnement*), to select R.G.E. qualified building enterprises, is now mandatory if the private landlord is willing to benefit from the Eco-loan, tax deductions or other public subsidies (ADEME 2014).

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	France - Tenant- and investor-sided barriers and policies

**Table 14: France - Tenant- and investor-sided barriers and policies**

variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	low, but increasing	-	-
income too low to pay modernisation costs or higher rents	tenant	so- cial/demographic	affordability	landlord-tenant (split incentive between cost bearing investor and beneficiary)	high	Sharing of energy efficiency savings (inefficient)	-
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	landlord-tenant (split incentive between cost bearing investor and beneficiary)	-	-	-
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	landlord-tenant (split incentive between cost bearing investor and beneficiary)	-	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium	To develop territorial platform to inform private landlords	Deployment of 600 platforms all over the French territory
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium	-	-
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	landlord-landlord (split incentives between free riders and investing landlords)	Medium but decreasing	Market uptake of the green value.	-
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack of knowledge	landlord-public (split between public benefits and individual cost bearing)	high	To develop territorial platform to inform private landlords	Deployment of 600 platforms all over the French territory
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack of knowledge	landlord-public (split between public benefits and individual cost bearing)	high	To develop territorial platform to inform private landlords	Deployment of 600 platforms all over the French territory
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	landlord-public (split between public benefits and individual cost bearing)	-	-	-
insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	landlord-public (split between public benefits and individual cost bearing)	Medium	The amount of Eco-PTZ may cover up to 100% of the renovation costs	Deployed
limited ability/willingness to adapt to technological change, because landlords are too old	investor	so- cial/demographic	age	landlord-landlord (split incentives between free riders and investing landlords)	Medium and increasing	To qualify the building enterprises + information provided to private owners in the territorial platforms.	In the phase of deployment.
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	landlord-public (split between public benefits and individual cost bearing)	none	None	-
<b>Data source and reference year</b>	(Notaires de France 2015; Department of Environment Energy and the Sea 2016b; ADEME 2014; Outrequin et al. 2008; Loi de transition énergétique 2014; Bosvieux 2012; Fawcett et al. 2013)						
<b>Remarks</b>							

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	France - Regulation and refurbishment process issues

**Table 15: France - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	medium	Metering to measure the individual consumptions will be mandatory	Individual meters for water and heating will be mandatory (starting date 1 <sup>st</sup> of January 2017) in multi-families buildings
Rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	medium	Energy sharing (50/50 for a period up to 15 years) is legally possible but in fact not realistic due to the high tenants' mobility in the private rented stock	
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	high	To guarantee availability of the sources of financing (ecoprêt) for a period of four years (2014-2018)	
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	none		
Long unattractive process reduces retrofit incentive, transaction costs too high	process-es/management	regulatory/financial	Administration & Process barriers	Medium but decreasing		
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	process-es/management	regulatory	Shared Ownership	high	Collective Eco loan Zero interest rate.	Deployed since 1 <sup>st</sup> January of 2014
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	process-es/management	other	Time Constraints	none		
Costly compensation for tenants reduce living quality/ temporary unavailable dwelling units	process-es/management	financial	construction side effects	medium	Technical vacancy	
Data source and reference year	(Notaires de France 2015; Department of Environment Energy and the Sea 2016b; ADEME 2014; Outrequin et al. 2008; Loi de transition énergétique 2014; Bosvieux 2012; Fawcett et al. 2013)	Ibid.	Ibid.	Ibid.	(Ministère du Logement et de L'habitat Durable 2016a; Department of Environment Energy and the Sea 2016a)	(Loi de transition énergétique 2014); (Décrets 2009-1438 et 2009-1439 du 23 novembre 2009)
Remarks						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	France - Construction industry, consultants and building stock issues

**Table 16: France - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	high	Territorial platform	Deployment of 600 territorial platform by the end of 2017
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	high	Label R.G.E. To mobilize the building sector and increase its professional competences.	Deployment of 600 territorial platform by the end of 2017
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	none	none	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	none	none	-
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	none	none	-
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	low	none	-
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	low	none	-
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	none	none	-
Data source and reference year	(ADEME 2014; Outrequin et al. 2008)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						



### **3.4 Germany - Investment barriers, split incentives and policies**

The reduction of carbon emissions by 40% by the year 2020 and 80% by 2050, relative to 1990, is one of the main climate change objectives in Germany. The step-by-step national aim is to reduce carbon emissions with 55%, 70% and 80% by 2030, 2040 and 2050 respectively. The same objective is set for renewable energy use (gross energy use) of 18%, 30%, 45% and 60% every ten years between the period of 2020 and 2050. A reduction of primary energy consumption of 20% by 2020 and 50% by 2050, relative to 2008, is also a national aim. With regards to energy consumption of households, Germany intends to double the rate of building renovation, to upgrade energy performance, from approximately 1% to 2% per annum by providing grants for building owners that fulfil energy efficiency requirements (BMW i 2010). There are numerous market related energy efficiency investment barriers observable in Germany. The market is subjected to significant fragmentation as properties are managed, operated, planned and designed by various market players. However, not necessarily all of these agents are experts on energy efficiency and therefore support its diffusion. The low acceptance of Life-Cycle Costing as an approach to consider an investment decision, often favours less energy-efficient approaches (Amecke & Deason 2013). High expectations on amortisation are evident, accompanied by a lack of willingness to postpone paybacks to the future. This is further supported by the fact that homeowners are typically older in Germany relative to other countries. They require clear cost-benefit evidence and short calculation periods (Power & Zulauf 2011). Further barriers include the lack of education and training of respective professionals as well as the limited transparency on cost-effectiveness and availability of information on energy efficiency retrofit measures. There is a variety of energy standards, as measured according to EnEV / KfW standards, but there is no direct transparency or compatibility regarding the actual value in kWh/m<sup>2</sup>a. This causes a demand for consulting in the vast majority of projects, which faces a lack of trust in experts, energy advisers and builders (Power & Zulauf 2011).

The interplay of legal regulation and financial support from public bodies causes uncertainties regarding the future support of measures. In this regard, the combination of higher required energy standards combined with lower volume of support creates further uncertainty on financial viability. The regulation system in place is considered to be too complex

and public financing schemes are driven by a combination of national regulation, the local systems in place and the collaboration of the local commercial bank as the KfW has no branch system (Power & Zulauf 2011). Finally, energy efficiency investments cannot compete with other investment alternatives from a financial management perspective and this, combined with longer expected pay back periods and a lack of skills, depicts the biggest investment barrier (Pfliegner et al. 2012). Germany follows a three-pillar approach comprised of (i) a legal framework, (ii) subsidy programmes and (iii) information, advice & support. This is considered a stable and attractive approach to account for market-related barriers or reservations of investors (Power & Zulauf 2011). Generally, public control fosters the idea of individual motivation and incentive. Still, public authorities developed a whole variety of regulations to meet the goals and achieve retrofit diffusion. The 2007 Integrated Climate and Energy programme was designed to ensure a modern energy supply that considers energy-friendliness of production and distribution. In its 2010 Energy Policy and Energy Concept for 2050, the Federal Government demands high energy efficiency for the future and an expansion of renewable energy. Also, a climate-neutral building stock appears strongly relevant for the real estate industry. In the German Adaption Strategy, a number of measures were gathered that combine improvements in the building stock with contributions to climate protection. The 2011 parliamentary resolution to phase out nuclear power by 2022 further shows the straightforwardness of energy-related goals. As a central mechanism for real estate, the EnEV ordinance has increased building standards and requirements significantly from 2009 on (EnEV 2016). In a second step, the 2013/2014 standards were further tightened by up to 30 % - as an important step toward the 2050 goal of almost zero energy / climate-neutral buildings.

In this context, the collaboration with stakeholders and improving awareness within different groups of interest and the population seemed appropriate and expedient. Also, the split-incentive problem (user-investor dilemma) found an acceptable solution in regulation on rent increase according to BGB (Civil Code). The KfW Financing is the central tool for granting high-volume financial support for energetic retrofits in Germany. The KfW financing is constituted by low interest rates as well as a partial exemption of liability for the commercial bank that is performing the actual financing. The KfW financing is particularly widespread, as it does not exclude certain types of owners (KfW 2016). In the context of the German Energy Efficient Construction and Rehabilitation (EECR) programme, owners

have general access to the funding available (Pfliegner et al. 2012). The 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, training of experts, transparency on standards as well as the communication of best-practice examples. Generally, German funding pools have traditionally been well-equipped with government support for existing buildings and provided up to 500 million Euro from 2009 to 2012 as required by German Energy Concept 2050 (Power & Zulauf 2011).

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Germany - Tenant- and investor-sided barriers and policies

Table 17: Germany - Tenant- and investor-sided barriers and policies

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	low	-	-
Income too low to pay modernisation costs or higher rents	tenant	so- cial/demographic	affordability	-	medium	-	-
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	-	none	-	-
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	-	low	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	-	low	-	-
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	-	low	Energy/fuel taxes, (cf. Energie-StG = Energy Tax Law)	-
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	-	medium and increasing	-	-
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack of knowledge	-	high	Information campaigns and subsidies for energy consulting.	-
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack of knowledge	-	medium and increasing	Information campaigns and subsidies for energy consulting.	-
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	landlord-tenant (split incentive between cost bearing investor and beneficiary)	high	Favourable loans or subsidies by public institutions.	-
Insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	-	medium	Favourable loans or subsidies by public institutions.	-
limited ability/willingness to adapt to technological change, because landlords are too old	investor	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and increasing	Obligatory efficiency in association with alterations/ modernisations (cf. EnEV = energy saving ordinance)	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	-	medium and increasing	obligatory efficiency in association with alterations/ modernisations (cf. EnEV)	gradually tightening of standards (in particular EnEV = energy saving ordinance)
Social welfare recipients receive heating allowance – no incentive to save energy.	tenant	social/regulatory	No incentives for tenants or landlords to care about efficiency	landlord-public (split between public benefits and individual cost bearing)	medium and increasing	-	-
Data source and reference year	(BAFA 2014; EnEV 2016; KfW 2016)	ibid.	ibid.	ibid.	ibid.	ibid.	ibid.
Remarks							

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Germany - Regulation and refurbishment process issues

**Table 18: Germany - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	medium	Mandatory metering (cf. HeizkostenV = heating costs ordinance).	-
Rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	low	-	-
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	none	-	-
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity/perceived risk	low	-	-
Long unattractive process reduces retrofit incentive, transaction costs too high	process-es/management	regulatory/financial	Administration & Process barriers	high	Subsidies for energy consulting planning and construction support.	-
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	process-es/management	regulatory/other	Shared Ownership/coordination effort	high	-	-
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	process-es/management	other	Time Constraints/coordination effort	medium	-	-
Costly compensation for tenants reduce living quality/ temporary unavailable dwelling units	process-es/management	regulatory/financial	construction side effects/ compensation law/ tort	medium	Regarding energy efficiency refurbishment measures, rent reductions are excluded for three months (cf. 536 (1a) BGB = civil code).	-
<b>Data source and reference year</b>	(BAFA 2014; KfW 2016; Outrequin et al. 2008)	ibid.	ibid.	ibid.	ibid.	ibid.
<b>Remarks</b>						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Germany - Construction industry, consultants and building stock issues

**Table 19: Germany - Construction industry, consultants and building stock issues**

Variable	key actor/issue concerned	classification of investment barrier	mechanism	relevance	existing measures to overcome barrier	planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	medium and increasing	Information campaigns and subsidies for energy consulting.	-
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how/ (implementation) risk	medium and increasing	-	-
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	low	-	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	low	-	-
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	low	-	-
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	medium	-	-
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	high	Favourable loans or subsidies by public institutions.	-
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	low, but increasing	-	-
Data source and reference year	(BAFA 2014; KfW 2016)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

### **3.5 Netherlands - Investment barriers, split incentives and policies**

The built environment contributes 30% to the total energy consumption in the Netherlands. Numerous objectives have been put in place to curb energy consumption and include; (i) contributing to the European objective of 20% CO<sub>2</sub> reduction in 2020 by means of energy savings in the built environment, (ii) using energy savings as a means to allow people more control of the increase in living expenses and (iii) using energy saving as a boost for the construction industry (Ministry of the Interior and Kingdom Relations 2011). In the process of combatting climate change the Netherlands aims to reduce CO<sub>2</sub>, relative to 1990 levels, with 20% and 40% by 2020 and 2030 respectively, establish 20% renewables by 2020 and facilitate a 2% improvement in energy efficiency of households (Ministry of Infrastructure and the Environment 2013). One of the main barriers to energy efficient retrofits is the split incentive associated with the party that incurs cost and others that benefit. In this regard investing parties, such as housing corporations, incur the cost (and potential risk) of the retrofit, from which the benefits are experienced by the tenant in the form of better homes and lower energy bills. In addition, social tenants or low income households cannot afford rental increases or other investments, unless the possibility of compensation in total housing cost is available. The economic situation in the Netherlands contributed to a shift towards renting rather than ownership, due to the decline in disposable income and consumer spending, reducing the willingness to renovate homes. There is a continuous lack of interest as retrofits are perceived as unattractive and consumers need to prioritise against competing demands for time, money and other desires. Homeowners need to be inspired as there is no perceived added value associated with whole house retrofits. Another country specific barrier revolves around core housing stock agreements (Weevers & Go 2010). Agreements between municipalities and corporations about the minimum number of affordable homes in an area combined with agreements on maximum rents, constraining investment capacity by maintaining homes with low rents but poor energy performance (95% of the social housing stock has an energy label C or worse).

This may increase housing costs via increasing energy costs (Weevers & Go 2010). Thinking in total housing costs, instead of rent expenses, creates the opportunity to compensate higher rents with lower energy bills. A more public approach to bridge barriers includes regulation that enforces ending market failures (Cohen & Winn 2007). Currently prominent market failures include; (i) flawed pricing mechanisms, (ii) treating fossil fuels as endless

sources of energy and (iii) ignoring or not including externalities in the energy price calculation. Addressing these market failures would be a major step in making a competitive environment for alternative renewable energy sources. Further regulation should take the form of price incentives, where higher energy prices and fuel tax increase the financial incentive for retrofit investments over the long run (Cohen & Winn 2007). Further policy initiatives should enforce a minimum energy label to reduce the low rent but high energy cost pitfall. Efforts towards promotion and communication are fundamental to ensure continuous information flow and best practice sharing with regards to retrofit investment projects. The effect can be enhanced if communication is combined with community projects and social promotion campaigns. Financial incentives should also be in place to enhance the attractiveness of these initiatives.



<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	The Netherlands - Tenant- and investor-sided barriers and policies

**Table 20: The Netherlands - Tenant- and investor-sided barriers and policies**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	social/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Low/medium	-	-
income too low to pay modernisation costs or higher rents	tenant	social/demographic	affordability	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and increasing	Housing allowance for social rents (below €710,63 rent cap)	-
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	(depends additionally on utility bill in- or excluded in rent)	high	-	-
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	-	high	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	-	High	-	-
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	-	High	-	Pigouvian tax schemes.
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	-	Low	Mandatory energy label (EPC) to support value of EE homes	-
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack of knowledge	-	Medium	Central/Governmental information websites are available.	-
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack of knowledge	-	Medium	Information websites are available.	-
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	-	High	Financial support/ tax incentives are available.	-
Insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	-	Medium and increasing	Financial support/ tax incentives are available.	-
Limited ability/willingness to adapt to technological change, because landlords are too old	investor	social/demographic	age	-	Low	-	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	-	High	Informational Investment tool (owner-occupier perspective)	Increase incentive by sustaining an updated information supply, financial support and mainly increase regulatory stringency and enforcement.
Data source and reference year	(MMM 2016; CFP 2016; Rijksdienst voor Ondernemend Nederland 2016)	ibid.	ibid.	ibid.	ibid.	ibid.	ibid.
Remarks							

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	The Netherlands - Regulation and refurbishment process issues

**Table 21: The Netherlands - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	low	Mandatory metering	Mandatory metering per apartment in AB's. Mandatory smart metering (with privacy protection options).
Rent increases or modernisation cost sharing not possible.	institutional	regulatory	limited incentive to invest in efficiency measures	medium	Renovation and rent increase has to be agreed upon by the tenant in most cases. Social housing has a rent cap, which complicates the possibilities further.	-
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	low	-	-
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	medium and increasing	-	Communicate long term housing regulation agenda - stakeholder driven information sharing.
Long unattractive process reduces retrofit incentive, transaction costs too high	process-es/management	regulatory/financial	Administration & Process barriers	medium	-	Prioritise EE retrofit permits, provide free or reduced transaction fees
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	process-es/management	regulatory	Shared Ownership	medium and increasing	-	Establish long term retrofit plans combined with clear communication with tenants/Owners Association.
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	process-es/management	other	Time Constraints	medium and increasing	-	Establish long term retrofit plans combined with clear communication with tenants/Owners Associations. Consider scheduling, communication and phased renovation.
Costly compensation for tenants reduce living quality/ temporary unavailable dwelling units	process-es/management	financial	construction side effects	medium	-	Communicate retrofit benefits and hassle clearly, reach support base pre retrofit efforts.
Data source and reference year	(MMM 2016; CFP 2016; Rijksdienst voor Ondernemend Nederland 2016)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	The Netherlands - Construction industry, consultants and building stock issues

**Table 22: The Netherlands - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	medium and increasing	Information websites.	Increase active promotion and local support points
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	low, but increasing	List of capable supply agents are available.	-
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	low	-	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	low, but increasing	Weak demand issue; subsidy schemes available.	-
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	medium	-	Inform about benefits of advanced investments in EE.
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	medium	-	Encourage relative favourable cost/benefits investments first, while technologies can mature.
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	high	-	-
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	medium	-	-
Data source and reference year	(MMM 2016)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

### **3.6 Poland - Investment barriers, split incentives and policies**

Polish objectives in combatting climate change take various forms. Firstly, by reducing the energy intensity of Polish economy to the EU-15 level and achieving zero-energy growth in conjunction with population growth in Poland. Secondly, enhancing of power generation by building highly efficient energy generation units as well as using existing weirs owned by the State Treasury for power generation. This will contribute to achieving a twofold increase by 2020 (relative to 2006) in power generation, by the use of highly efficient cogeneration technology. In addition, the country aims to increase the use of renewable energy sources to 15% in 2020, and continue this trend into the future. Finally, by increasing the diversification of supply sources and creating optimal conditions for distributed power generation, based on locally available resources and increasing the ratio of annual demand for power to the maximum demand for power at peak usage hours. This allows limiting the total cost of meeting the demand for power (Ministry of Economy 2009). There is a series of legal barriers affecting the dynamics of the willingness to retrofit. Firstly, the Energy Efficiency Act of August 2014 does not make sufficiently severe sanctions with regards to the lack of energy performance certificates of buildings. It does not require the preparation of energy performance certificates in the case that the building is used (or built) by the owner for personal use. The energy performance certificate shall be drawn up only to be forwarded to the tenant or buyer on the occasion of the lease or sale of the building. However, there are no recorded clear sanctions for failure to send such certificate. It is provided only that in the event of failure to comply with this obligation, the purchaser or tenant has the right to carry a certificate at the expense of the seller or landlord. It is therefore common to ignore the obligation to present energy efficiency certificates of rental transactions and consequently no incentive towards improving energy efficiency. Secondly, Energy efficiency services agreement is neither standardised nor named. Therefore the parties, especially those related to central and local administration, happen to have substantial concerns, doubts and worries with regards to using EPC contracts.

These issues result mainly from the risk of raising allegations concerning the absence or inaccuracy of certain clauses. Further consequences include the lack of PPP projects using the EPC and the limited development of the market entities that are energy service providers within the meaning of Art. 2 point 24 of Directive 2012/27 / EU (MPO 2014). This includes segment ESCOs. Further, the regulation by the Minister of Finance of 28 Decem-

ber 2011 on the specific method of debt instruments classification (Journal of Laws No. 298 pos. 1767), posits that not only current instalments, which has already been invoiced, but all, including future, yet not matured annuities in respect of the EPC (energy performance contract) due from the owner of the property in relation to the ESCO performing investment raising energy efficiency must be recognised by the landlord as liabilities (Bertoldi et al. 2014). This leads to an unnatural increase of debt ratios, as similar bills for the supply of energy, the reduction of which is the subject of investments involving ESCOs, do not need recognition as a liability until the invoice. Therefore, investor, though lowering (through the investments of ESCO) his obligations towards suppliers of energy, is obliged to recognize the increase of liabilities instead of their decline. Local government units and enterprises belonging to them are subject to strict limits of such debt. Therefore, most often, it leads to the exclusion of ESCO formula from the implementation of such investments (Berent-Kowalska et al. 2015). This also affects private investors when they are assessed by banks for debt ratios. Lastly, the cost of renting premises is not tax-deductible. This is brought forward by the Personal Income Tax Act Dz.U.2012.361. This has the consequence of limited demand for rentals and therefore does not create a sufficiently strong incentive to improve standards, even in areas where numerous employees migrate from their own distant homes. Economic conditions also impose barriers, as high employment rates and a relatively low average wage curb disposable income. The high cost associated with retrofits combined with long payback periods and significant upfront capital outlay reduces retrofit attractiveness. There is a lack of knowledge, understanding and awareness of what whole house retrofits entail as well as limited accessibility of information on solutions and new technologies available.

The government also does not provide complete clarity of future legislation and therefore no clear economic calculation setup for potential energy retrofit investors exists. There is no perceived added value or need for whole house retrofit if no state aid stimulants are in place. Finally, energy performance is not reflected in property value. The government needs to ensure that regulation and enforcement of minimum standards are in place. In this regard, ignoring energy efficiency certification needs to be subjected to significant penalisation. There is a need for a national programme and departmental integration as well as assurance of long term policy initiatives, thereby removing stop-go programmes. Pursue active promotion and provide more information on technologies and direct benefits

associated with green energy retrofits. The establishment of one central entity for information, integration and coordination of activity of various actors will also contribute to information share in the long run. Simple plan schemes should be constructed on a list of measures rather than solely the resulting performance, thereby minimising the actual vs predicted performance risk. Finally, combine support schemes aimed at technological results with those aimed at social effects (PwC 2010).

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Poland - Tenant- and investor-sided barriers and policies

**Table 23: Poland - Tenant- and investor-sided barriers and policies**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	low	-	-
Income too low to pay modernisation costs or higher rents	tenant	so- cial/demographic	affordability	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium	Country-wide (Infrastructure and Environment 2014-2020) and Regional Operational programmes supporting multifamily residential buildings refurbishment.	-
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	-	medium and increasing	-	-
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	-	high	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	-	high	-	-
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	-	high	-	-
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	-	high	-	-
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack of knowledge	-	medium and increasing	-	-
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack of knowledge	-	medium and increasing	-	-
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	-	high	-	-
Insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	-	high	-	-
Limited ability/willingness to adapt to technological change, because landlords are too old	investor	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium	-	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	-	medium and increasing	-	-
Data source and reference year	(MPO 2014; Berent-Kowalska et al. 2015; PwC 2010)	ibid.	ibid.	ibid.	ibid.	ibid.	ibid.
Remarks							

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Poland - Regulation and refurbishment process issues

**Table 24: Poland - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	none	-	-
Rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	none	-	-
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	high	-	-
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	medium and increasing	-	-
Long unattractive process reduces retrofit incentive, transaction costs too high	processes/management	regulatory/financial	Administration & Process barriers	High	-	-
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	processes/management	regulatory	Shared Ownership	High	-	-
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	processes/management	other	Time Constraints	none	-	-
Costly compensation for tenants/reduce living quality/ temporary unavailable dwelling units	processes/management	financial	construction side effects	high	-	-
Data source and reference year	(MPO 2014; Berent-Kowalska et al. 2015; PwC 2010)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						



<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Poland - Construction industry, consultants and building stock issues

**Table 25: Poland - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	medium and increasing	Measure 1.3.1 of the OPI &E 2014-2020 supports Energy Efficiency advisors in local authorities' offices.	-
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	medium	-	-
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	low	-	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	medium	-	-
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	medium	-	-
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	medium	-	-
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	high	-	-
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	medium	-	-
Data source and reference year	(MPO 2014; Berent-Kowalska et al. 2015; PwC 2010)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

### 3.7 Spain - Investment barriers, split incentives and policies

There are numerous policies in place to ensure that Spain does their part in combatting climate change. More specifically, government objectives include reducing energy consumption reduction by 44 million barrels of oil which is equivalent to 10% of the country's annual oil imports. Similar to many other countries, the transport and manufacturing industry in Spain contributes to the majority of GHG emissions, with the residential sector being responsible for 17%, emphasising the significant contribution of green residential retrofit investments (IDAE 2015). Certain economic barriers are evident, subjected to the economic situation in Spain, and tend to surface and disappear when economic conditions fluctuate due to demand and supply side momentum. High unemployment rates, coupled with high levels of job uncertainty reduce the confidence of new investments, especially in young households. Households also have limited purchase capacity due to the reduction of household income brought forward by austerity measures put in place over the past five years. Credit flows has reached a historical low in 2014, reflecting strong credit constraints, which will unquestionably reduce the investment attractiveness of retrofitting in the near future. The fiscal system does not contribute to any retrofit incentives and also does not apply any property tax relief associated with greener properties until 2016<sup>5</sup>. Energy labels assigned to a property also does not always reflect whole house characteristics to enable a proper energy rating of the property. Retrofit investments are therefore perceived as a sunk cost due to the current lack of energy consumption improvements' reflection in property value. Therefore, no market incentive exists. For emission reduction initiatives to be effective, education and awareness is fundamental to ensure that investment decisions is based on sound information, consequently simplifying the retrofit investment decision.

From a supply perspective, building construction and development projects also reached an historical low, diminishing the effectiveness of public policy on new stock that aims to boost retrofit decisions and energy consumption plans. This diminishes the momentum of energy efficiency improvements and reduces the possibility of a feedback loop that successful schemes might have for future projects. The new technology enterprises put in

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<sup>5</sup>However, there are increasing news collecting social reactions which shows strong sensibility to this and the government decided to reduce until a 20% reduction of real estate tax (IBI) depending on energy classification (20% for A label, 16% for B, 12% for C, 8% for D and 4% for E). The measure came into effect on 1.1.2016.

place to reduce energy consumption, are increasing building costs and consequently remove some of the financial incentives for developers. The industry as a whole has not reached significant production volumes and therefore economies of scale are currently non-existent. The market is also subjected to an *oligopoly effect* due to the Spanish system determining which firms can install the green technology, which affects prices of installations. Finally, technical barriers include the development of research themes that can identify efficient systems to extract and implement clean energy, by including new materials and approaches. In breaching fiscal barriers to retrofit investments, easing of financial market barriers would facilitate greater credit availability to the mortgage market and therefore increase the possibility of retrofits being undertaken. Given that no current tax incentives associated with green energy retrofits exist, this should be a starting point to increase the incentive to undergo green retrofits. More funding is required to ensure that research development projects are continuously focussed on identifying innovative green technologies, materials and construction techniques. This will also stimulate more research in the field and improve efficiency in the long run. Government systems need to be put in place to ensure that property energy labels clearly reflect whole house characteristics<sup>6</sup> thereby enabling a proper energy rating of the property. In this regard, accurate labelling will lead to a better indication of green value in order to capture how energy efficiency is capitalised into property prices. Consequently, this will enhance the incentive to invest in green retrofits and increase momentum of energy efficiency retrofits over time. Increasing support for new technology and renewable energy start-ups by government will unquestionably increase market competition, moving away from the current oligopolistic structures in place and facilitate to greater price stabilisation. Finally, education and information share is fundamental to ensure community awareness. Even though communities are fully aware of the emission reduction requirements in Spain, more information and support are required from government to combat both economic and technical barriers. This, combined with

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<sup>6</sup> The energy label is calculated based on many technical characteristics. The estimation process is regulated by Real Decret 235/2013 of 5 April 2015, published in BOE number 89 (13/04/2013). The labels are calculated depending on the climatic area. A programme developing the RD235 has been built and implemented by Autonomous Communities among Spain to estimate labels technically. For further information see: <http://gcee.aven.es/publico7/>, or <http://certificacio-energetica.com/descargar-los-programmeas-de-certificacion-energetica/>

continuous information flow and economic recovery, will increase the demand for energy efficiency retrofits in the future.

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Spain - Tenant- and investor-sided barriers and policies

**Table 26: Spain - Tenant- and investor-sided barriers and policies**

variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	social/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and increasing	Rent regulation that enables cost/benefit sharing of energy efficiency renovations.	-
Income too low to pay modernisation costs or higher rents	tenant	social/demographic	affordability	landlord-public (split between public benefits and individual cost bearing)	medium and increasing	Regulation that establishes grants for energy efficiency retrofits to homeowners and tenants (by previous agreement).	Identify and establish how to manage cost sharing and special programmes.
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and increasing	-	Lowering property tax incentives (transmitted to final rents) associated to better energy labels. Improved social perceptions of EE retrofits.
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ Informational	No perceived personal household utility, low willingness to pay rent increases	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and increasing	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	-	medium and increasing	-	Create tax incentives or rent reduction for energy efficient units.
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	-	high	-	-
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	-	high	Property Tax benefits starting in 2016.	Income Tax benefits of better energy labels (ratings).
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack knowledge of	landlord-public (split between public benefits and individual cost bearing)	high	-	Energy Agencies should increase the promotion and information of existing technologies and suppliers.
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack knowledge of	-	high	-	Increase information share with public documentation prepared by construction and technical professionals.
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and increasing	-	Improve household/firm perception of low energy benefits (reduction of energy bill guarantees in advance of retrofit initiative).
Insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	-	high	There are financial schemes for firms, but strong credit constrains.	-
Limited ability/willingness to adapt to technological change, because landlords are too old	investor	social/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	Medium and increasing	Possibility to share costs.	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	-	high	Reduction on property tax.	-
Data source and reference year	(LAU 2013; RRRU 2013; IDAE 2015; PGE 2016)	lbid.	lbid.	lbid.	lbid.	lbid.	lbid.
Remarks							

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Spain - Regulation and refurbishment process issues

**Table 27: Spain - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	High	Energy prices are based on Public decision every year (Orden IET 2015)	-
rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	Low and increasing	Regulation allows rent increases and cost sharing.	-
higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	medium and increasing	-	Some automatism in public programmes to be repeated every year for bi-annual programmes.
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	medium	Government websites clarifying plans and costs.	Transparency of future plan Declarations
Long unattractive process reduces retrofit incentive, transaction costs too high	process-es/management	regulatory/financial	Administration & Process barriers	High	-	Reduce document requirements and long processing times
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	process-es/management	regulatory	Shared Ownership	High	Decision making process in shared ownership buildings are regulated – decisions subjected to majority of owners.	Establish coordination with real estate managers (compulsory figure under Spanish regulation) and ‘comunidades de propietarios’ (owners’ communities) to coordinate the processes.
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	process-es/management	other	Time Constraints	medium and increasing	-	Communication relating to processes, time and costs.
Costly compensation for tenants/reduce living quality/ temporary unavailable dwelling units	process-es/management	financial	construction side effects	High	-	Technological solutions to reduce time for retrofitting.
<b>Data source and reference year</b>	(LPH 1960; LPHR 1999; LAU 2013; REE 2015; RRRU 2013; BOE 2015)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
<b>Remarks</b>						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	Spain - Construction industry, consultants and building stock issues

**Table 28: Spain - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	medium		Produce a technical Information booklet to increase knowledge about technical processes of retrofits.
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	medium	Retrofit should be compulsory for Building Engineers and Architects, while requirements for other levels to acquire accreditation via registration.	Accreditation at technical (professional) level with stronger requirements of installations.
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	low	-	-
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	high	-	Increase technical accreditation quality for energy installations. Identify and solve potential monopoly actions from producers/suppliers
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	medium	Building retrofitting is promoted by several laws. The Plan de Acción 2014-2020 contains several types of grants for energy retrofitting.	Especial programmes to reach energy efficiency for aged and protected buildings. Improve technological innovations for retrofitting in protected buildings
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	medium	There are public programmes supporting energy efficiency installations/retrofitting.	Manage joint agreements with building co-owners for renovation.
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	high	-	Special programmes to reach energy efficiency for aged and protected buildings
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	medium and increasing	-	Develop programmes with information about new technologies. Public list of high-tech systems for buildings.
Data source and reference year	(RE-CE 2013; LOE 1999; RRRU 2013; REE 2015)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
Remarks						

### **3.8 United Kingdom - Investment barriers, split incentives and policies**

In response to the Climate Change Act 2008, the HM Government 2050 Pathways Analysis outlines the steps towards cutting 34% of emissions by 2020 and 80% by 2050 (Department of Energy and Climate Change 2010). Currently, home and business heating is one of the three areas contributing to 80% of the UK's GHG emissions, emphasising the importance of green retrofit initiatives (HM Government 2011). However, the willingness of homeowners to buy into these initiatives is continuously hampered by various barriers. This section outlines these barriers and provides best practice approaches to address these barriers towards a more energy efficient future for the UK. Many of the barriers associated with energy efficiency retrofit investments can be ascribed to the economic situation in the UK. High unemployment rates, less disposable household income and reduced consumer spending, contributes to the shift from home ownership towards the rental market, from which spending on renovations and retrofits in itself creates a barrier. The costs associated with these retrofits are subjected to long payback periods, partial funding plans, large upfront capital requirements (Lewis & Smith 2013) and significant maintenance costs, emphasising the need for adequate funding alternatives (BPIE 2011). There is however, a lack of funding in the UK which can be ascribed to high interest rates, the ineffective Green Deal initiative and inefficient Energy Company Obligation (ECO) funding available to home owners, as well as the stop-go history associated with energy efficiency funding grants (Lewis & Smith 2013). These deals are also subjected to very complex financial structures to be viable. Homeowners, wishing to undertake DIY retrofit refurbishments do not qualify (Lewis & Smith 2013), which further increase the barrier towards green refurbishments in UK homes.

There is also a lack of knowledge and awareness of what whole house retrofits actually include, for example; (i) its effect on building structures, as it is argued to be ugly and unattractive, (ii) its contribution towards significant carbon savings and (iii) the solutions and technologies available at both the local and national level.

In addition to the lack of clarity with regards to future plans, the government's legislation revolving around a minimum EPC rating of "E" for rentable homes by 2018 (GVA 2014) is perceived as too little too late, as these improvements do not apply to the majority of UK homes (HM Government 2011). The government agenda does not include whole house retrofits, reflecting the lack of legislation and the need for more robust incentives. Whole



house retrofit projects are subjected to planning permissions, legal issues and the consideration of neighbours, which is all in conflict with adopting a whole house retrofit approach. Given the time requirements for these refurbishments, coupled with the fact that it is still a relatively new initiative to adopt in the UK, there currently is not an abundance of empirical evidence displaying that energy performance is reflected in property value, which reduces the incentive to invest in the sector. If no evidence of economies of scale is available for whole house retrofits, it is highly probable that government subsidy initiatives will have to be in place however, there is a significant shortage of community schemes currently available in the UK (Lewis & Smith 2013). The average homeownership duration in the UK is 10 years, from which the payback period for retrofit investments are likely to exceed the time of actually owning the property. The tools and approaches to analyse and calculate carbon savings and future performance are inaccurate from which differing messages are received by consumers and no accurate benchmarks for comparison currently exist in the UK. The concept of carbon trading and the process of selling electricity back to energy providers are also perceived as specialist (Lewis & Smith 2013). Energy bills are also not perceived as a significant monthly expense and are relatively affordable compared to other financial obligations, therefore not creating enough of an incentive towards energy saving. There is also a measure of utility associated with green retrofit investment decisions that creates an additional barrier. In this regard, there is a utility cost associated with the actual time required to undergo refurbishments and the potential restraints on the time available by homeowners. This is due to small windows of opportunity available during personal time or holidays.

This also contributes to the lack of consumer demand for refurbishments with cases in the UK where homeowners are unwilling to undergo retrofit measures even at no cost (Lewis & Smith 2013). Consequently, retrofits are perceived as unattractive and greater incentives need to be in place to counter the negative utility associated energy efficiency retrofits. There is a trade-off between time, money and the opportunity cost of the personal pass-time of homeowners, emphasising the importance of improving the perception associated with the value that energy retrofit investments hold (Lewis & Smith 2013). In combatting the unwillingness of homeowners to invest in energy efficiency initiatives, it is fundamental that there is an abundance of information available to prospective homeowners. Information creates awareness and knowledge which will help combat the negative perceptions

associated energy efficient retrofit investments. This includes a more active approach to promoting green retrofits, by providing more information on direct benefits and new technologies. This can be reinforced by local communities delivering key programmes and increasing information share by working with local media to ensure the correct information is communicated. In addition, the establishment of a central body i.e. a one-stop-shop portal for energy efficiency retrofit projects will create a brand-perception for consumers and simplify the process (Lewis & Smith 2013). To ensure sustainability, another form of active promotion includes the availability of more research funding to address issues associated with actual vs predicted performance as well as the encouragement of green innovation. With research comes evaluation, from which it is imperative that post occupancy assessments of retrofits need to be in place, ensuring a positive feedback loop and continuous development of best practice. In conducting research, emphasis must be placed on the fact that housing stock is diverse and no one-approach-fits-all can be proposed. Survey approaches must therefore be comprehensive and large in number (Lewis & Smith 2013).

Government regulation remains fundamental from which stronger enforcement and incentives can take the form of (i) higher energy and fuel prices, (ii) stamp duty linked benefits, (iii) Income tax rebate schemes, (iv) council tax reduction (permanent or once-off), (v) the establishment of tariffs and subsidies that is fair for both energy efficiency and renewable energy initiatives and (vi) making whole house retrofits mandatory. Emphasis should also be placed on sound policy initiatives in which merged government departments becomes key in communicating a consistent message across departments (Lewis & Smith 2013). Future policy frameworks need to deviate from short term plans and emphasise long term programmes that will remove uncertainty for potential agents. There is also a need for a national agenda in which future policy outlooks are summarised. Finally, these alternatives should be supported by continuous influence and aspiration by the establishment of minimum standards. In addition to the aforementioned best practice approaches, there is still a significant factor to be considered and addressed. Currently, there is a substantial cost to failure rate of energy efficiency retrofits, emphasising the need to reduce the risk associated with retrofit initiatives and improve cost effectiveness. In addressing this barrier, insurance packages coupled with customer care programmes throughout the process would already reduce the associated risk with these programmes. From creating awareness to

reducing risk and increasing government regulation, energy efficiency still needs to be quantified and reflected in property value. This is a great concern as the investment attractiveness within the market is rather limited. If energy efficiency is properly reflected in property prices, this will unquestionably stimulate investment initiatives in the sector. As a starting point, the associated value of an energy efficient house should have a label assigned to it, attaching value to the EPC rating of the property and further linking this label to high profile measures such as taxation and penalty charges (Lewis & Smith 2013).

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	The United Kingdom - Tenant- and investor-sided barriers and policies

**Table 29: The United Kingdom - Tenant- and investor-sided barriers and policies**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Is this a split incentive issue?	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Unequal distribution of tenant age in apartment blocks with different spending ability (pensioners).	tenant	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium	-	-
income too low to pay modernisation costs or higher rents	tenant	so- cial/demographic	affordability	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium and in- creasing	-	Sound policies and economic instruments to create monetary incentive. Designing special programmes will display a comprehensive demographic consideration by Government.
Less utility associated with energy savings relative to other household purchases/ items.	tenant	behavioural/ formational	In- personal household utility, low willingness to pay rent increases	-	medium and in- creasing	-	-
Less utility associated with comfort increases relative to other household purchases/ items.	tenant	behavioural/ formational	In- personal household utility, low willingness to pay rent increases	-	high	-	-
Retrofits perceived as secondary priority to households	tenant	financial	Limited household funds available for retrofits	-	high	-	Mandatory whole-house retrofit schemes combined with sound financing schemes.
Energy prices have marginal effect on monthly disposable income due to the low price - reducing incentive for retrofits.	tenant	Economic	Lack of internalising external cost in the price of the end-user.	-	high	-	Increase energy price by internalising the social cost of energy consumption. Affect consumption behaviour at the source.
The current energy savings that arise from energy efficiency retrofits are not reflected in property value – reduces investment incentive	investor	Economic	Lack of Value internalisation	-	high	-	Mandatory property rating (EPC) to ensure value of more efficient homes are internalised in price/rents.
Limited understanding of the options and technologies available for energy efficiency retrofits	investor	informational	Lack of knowledge	-	medium and in- creasing	-	Establish central body for education/information provision.
Lack of information reduces awareness and consequently the take-up of energy efficiency retrofits.	investor	informational	Lack of knowledge	-	medium and in- creasing	-	Establish central body for education/information provision – active promotion schemes – local community driven schemes. Communicate National Agenda.
Large up-front cost for retrofits reduces retrofit perceived affordability/increases profitability risk	investor	financial	Large initial capital outlay risk	-	high	-	Promote direct benefits (saving) combined with sound financial support/tax incentives.
Insufficient access to capital: credit constraints or insufficient equity capital available	investor	financial	Limited Funding/capital constraint/ high capital costs	-	high	-	Establish finance schemes based on average holding/renting periods of tenants.
Limited ability/willingness to adapt to technological change, because landlords are too old	investor	so- cial/demographic	age	landlord-tenant (split incentive between cost bearing investor and beneficiary)	medium	-	-
No incentive to consider retrofit investments.	investor	informational	Inability to perceive future benefits from retrofits.	-	medium and in- creasing	Forthcoming regulation: minimum standard (EPC)	Increase incentive by combining, direct benefits, regulation and financial support.
Data source and reference year	(GVA 2014)	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	The United Kingdom - Regulation and refurbishment process issues

**Table 30: The United Kingdom - Regulation and refurbishment process issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Tenants energy payments are not sufficiently based on individual consumption, e.g. no metering	institutional	technical/regulatory	limited incentive to reduce heat expenses	medium and increasing	-	Mandatory metering.
Rent increases or modernisation cost sharing not possible	institutional	regulatory	limited incentive to invest in efficiency measures	none	-	-
Higher perceived investment due to insecure government programmes that do not deliver	institutional	risk	Lack of Trust/perceived risk	high	-	Generate insurance schemes to cover failure and reduce associated risk.
Lack of clear understanding and communication of future plans and outlook by government reduces confidence	institutional	risk	Lack of Clarity	medium and increasing	-	Establish and communicate National Agenda – community driven information sharing.
Long unattractive process reduces retrofit incentive, transaction costs too high	process-es/management	regulatory/financial	Administration & Process barriers	high	-	Communicate direct benefits/saving of investment.
Shared ownership of buildings increases complexity and time of making retrofit investment decision.	process-es/management	regulatory	Shared Ownership	medium and increasing	-	Establish long term retrofit plans combined with clear communication with tenants.
Issues on limited time available for timely retrofit projects (only holidays) – unattractive.	process-es/management	other	Time Constraints	high	-	Establish long term retrofit plans combined with clear communication with tenants.
Costly compensation for tenants/reduce living quality/ temporary unavailable dwelling units	process-es/management	financial	construction side effects	high	-	-
Data source and reference year	(Lewis & Smith 2013; BPIE 2011; GVA 2014)	ibid.	ibid.	ibid.	ibid.	ibid.
Remarks						

<b>Report</b>	D 5.1: Existing measures and approaches for removing split incentive barriers in rental markets
<b>Section of report</b>	Country section: market barriers, split incentives and policies
<b>Fact sheet name</b>	The United Kingdom - Construction industry, consultants and building stock issues

**Table 31: The United Kingdom - Construction industry, consultants and building stock issues**

Variable	Key actor/issue concerned	Classification of investment barrier	Mechanism	Relevance	Existing measures to overcome barrier	Planned or innovative measures to overcome barrier
Processes and options available are perceived as specialist and complex.	construction industry/consultants	Informational	Limited technical know-how	medium and increasing	-	Establish active promotion schemes and local level knowledge corners to
Limited technical know-how and retrofit supply agents to install new technologies/ poor workmanship	construction industry/consultants	Informational	Limited technical know-how	medium and increasing	-	Training initiatives in tandem with established systems will enhance skills and lead towards continuous innovation across energy technology sectors.
Slow supply of construction materials and or lack of capacities in the building industry	construction industry/consultants	supply	resource constraints	low	-	
The lack of competition between suppliers keeps rates high and combined with other factors unaffordable.	construction industry/consultants	supply	Market failure/oligopoly	medium and increasing	-	Research and Development combined with training schemes will lead to an increase in service providers, competition and more affordable prices.
Majority of the housing stock not due to modernisation	Housing stock/construction technology	technical	building life cycle	medium and increasing	-	
Majority of the housing stock difficult/extremely costly to modernise	Housing stock/construction technology	technical	building life cycle	medium and increasing	-	Adjust the cost and benefit associated with energy efficiency measures to affect the respective user/investor (instruments associated with tax).
Demolition rates low relative to new development; majority of building stock is old and energy inefficient	Housing stock/construction technology	technical	building life cycle	high	-	
Technological progress awards postponing modernisation activities	Housing stock/construction technology	economic	limited incentive to invest now	medium	-	Continuous R&D programmes will provide supply driven technological development and continuous innovation.
<b>Data source and reference year</b>						
<b>Remarks</b>						

## 4 References

- ADEME, 2014. Organiser une plateforme de rénovation énergétique de l'Habitat. Available at: <http://www.ademe.fr/collectivites-secteur-public/integrer-lenvironnement-domaines-dintervention/renovation-lhabitat/dossier/organiser-plateforme-renovation-energetique/comment-creer-plateforme-renovation-energetique> [Accessed June 7, 2016].
- Amecke, H. & Deason, J., 2013. Buildings Energy Efficiency in China, Germany and the United States. Climate Policy Initiative, (April).
- BAFA, 2014. BAFA: Vor-Ort-Beratung, Available at: <http://www.bafa.de/bafa/de/energie/energiesparberatung/>.
- Berent-Kowalska, G., Peryt, S. & Wnuk, R., 2015. Energy Efficiency trends and policies in Poland: ODYSSEE-MURE 2015; Monitoring EU and national energy efficiency targets, Available at: <http://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf> [Accessed June 7, 2016].
- Bertoldi, P. et al., 2014. ESCO Market Report 2013, Available at: <https://ec.europa.eu/jrc> [Accessed June 7, 2016].
- BMW, 2010. Energiekonzept für eine umweltschonende, zuverlässige und bezahlbare Energieversorgung, BERN. Available at: [https://www.bundesregierung.de/ContentArchiv/DE/Archiv17/\\_Anlagen/2012/02/energiekonzept-final.pdf?\\_\\_blob=publicationFile&v=5](https://www.bundesregierung.de/ContentArchiv/DE/Archiv17/_Anlagen/2012/02/energiekonzept-final.pdf?__blob=publicationFile&v=5) [Accessed June 7, 2016].
- BOE, 2015. Orden IET/2735/2015, de 17 de diciembre, por la que se establecen los peajes de acceso de energía eléctrica para 2016 y se aprueban determinadas instalaciones tipo y parámetros retributivos de instalaciones de producción de energía eléctrica a partir de f, Available at: [http://www.omie.es/files/orden\\_iet\\_2735-2015.pdf](http://www.omie.es/files/orden_iet_2735-2015.pdf).
- Bosvieux, J., 2012. Bailleurs et locataires dans le parc privé, Paris. Available at: [http://www.anil.org/fileadmin/ANIL/Etudes/2012/etude\\_bailleurs\\_locataires.pdf](http://www.anil.org/fileadmin/ANIL/Etudes/2012/etude_bailleurs_locataires.pdf) [Accessed June 7, 2016].
- BPIE, 2011. EUROPE'S BUILDINGS UNDER THE MICROSCOPE, Available at: [http://bpie.eu/wp-content/uploads/2015/10/HR\\_EU\\_B\\_under\\_microscope\\_study.pdf](http://bpie.eu/wp-content/uploads/2015/10/HR_EU_B_under_microscope_study.pdf) [Accessed June 7, 2016].
- CFP, 2016. CFP Green Buildings: sustainability for buildings and organisations. Available at: <http://www.cfp.nl/en/> [Accessed June 6, 2016].

- Cohen, B. & Winn, M.I., 2007. Market imperfections, opportunity and sustainable entrepreneurship. *Journal of Business Venturing*, 22(1), pp.29–49.
- Department of Energy and Climate Change, 2010. 2050 Pathways Analysis, London. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/42562/216-2050-pathways-analysis-report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42562/216-2050-pathways-analysis-report.pdf) [Accessed June 7, 2016].
- Department of Environment Energy and the Sea, 2016a. Eco-interest loan (eco-PTZ). Available at: <http://www.developpement-durable.gouv.fr/Tout-sur-l-eco-pre-a-taux-zero,28949.html> [Accessed June 6, 2016].
- Department of Environment Energy and the Sea, 2016b. Energy Renovation Plan for Housing. Available at: <http://www.developpement-durable.gouv.fr/-Prime-Renovation-energetique-de,6751-.html> [Accessed June 6, 2016].
- EnEV, 2016. EnEV 2016: Increased new construction standard for residential and non-residential buildings. Available at: [http://www.enev-online.com/enev\\_praxishilfen/enev\\_2016\\_neubau\\_wohnbau\\_nichtwohnbau\\_dokumente\\_fa\\_q\\_kfw\\_foerderung.htm](http://www.enev-online.com/enev_praxishilfen/enev_2016_neubau_wohnbau_nichtwohnbau_dokumente_fa_q_kfw_foerderung.htm) [Accessed June 6, 2016].
- ENS, 2014a. Evaluering af BedreBolig-ordningens testforløb, Available at: [http://www.ens.dk/sites/ens.dk/files/forbrug-besparelser/groen-boligkontrakt/gradvis-lancering-i-kommunerne/evaluering\\_9\\_kommuner\\_d.\\_12-06-14.pdf](http://www.ens.dk/sites/ens.dk/files/forbrug-besparelser/groen-boligkontrakt/gradvis-lancering-i-kommunerne/evaluering_9_kommuner_d._12-06-14.pdf) [Accessed June 6, 2016].
- ENS, 2011. Klimapolitisk redegørelse 2011, Available at: [http://www.ens.dk/sites/ens.dk/files/politik/dansk-klima-energipolitik/Klimapolitisk Redeg%C3%B8relse 2011.pdf](http://www.ens.dk/sites/ens.dk/files/politik/dansk-klima-energipolitik/Klimapolitisk%20Redeg%C3%B8relse%202011.pdf) [Accessed June 7, 2016].
- ENS, 2014b. Strategi for energirenovering af bygninger, Available at: <http://www.ens.dk/sites/ens.dk/files/byggeri/Strategi-for-energirenovering-af-bygninger/strategi-for-energirenovering-af-bygninger-web-050514.pdf> [Accessed June 7, 2016].
- Fawcett, T., Killip, G. & Janda, K., 2013. Building Expertise: Identifying policy gaps and new ideas in housing eco-renovation in the UK and France, Available at: [http://www.eci.ox.ac.uk/research/energy/downloads/2-138-13\\_Fawcett.pdf](http://www.eci.ox.ac.uk/research/energy/downloads/2-138-13_Fawcett.pdf) [Accessed June 7, 2016].
- GVA, 2014. 2018 EPC minimum standards update, Available at: <https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&v>



ed=0ahUKEwiqyYzW7pLNAhXKlcAKHTA-

B60QFggdMAA&url=http://www.gva.co.uk/sustainability/2018-epc-minimum-standards-update/&usg=AFQjCNH5zv2cUtnpr4qBCfPISSTm4iWmKQ&sig.

Hilke, A. & Ryan, L., 2012. Mobilising investment in energy efficiency: Economic instruments for low-energy buildings, Available at

[https://www.iea.org/publications/insights/insightpublications/Mobilising\\_investment\\_EE.pdf](https://www.iea.org/publications/insights/insightpublications/Mobilising_investment_EE.pdf) [Accessed June 7, 2016].

HM Government, 2011. Carbon Plan, London. Available at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47621/1358-the-carbon-plan.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47621/1358-the-carbon-plan.pdf) [Accessed June 7, 2016].

HM Government, 2008. Climate Change Act 2008, Statute Law Database. Available at:

<http://www.legislation.gov.uk/ukpga/2008/27/contents> [Accessed June 7, 2016].

IDAE, 2015. La financiación del IDAE. Available at:

<http://www.idae.es/index.php/idpag.33/relcategoria.1024/reلمenu.377/mod.pags/mem.detalle> [Accessed June 7, 2016].

Immigration Integration and Housing Ministry, 2016. Building Urban Renewal. Available at:

<http://uibm.dk/arbejdsomrader/byfornyelse/bygningsfornyelse> [Accessed June 6, 2016].

KfW, 2016. Energieeffizient Sanieren – Investitionszuschuss (430). Available at:

[https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilien/Finanzierungsangebote/Energieeffizient-Sanieren-Zuschuss-\(430\)/#2](https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilien/Finanzierungsangebote/Energieeffizient-Sanieren-Zuschuss-(430)/#2) ;

<https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilien/Finanzierungsangebote/Energieeffizient-Sanie> [Accessed June 6, 2016].

LAU, 2013. Ley 4/2013 de Medidas de Flexibilización y Fomento del Mercado del Alquiler de Viviendas, de 4 de junio de 2013, Available at:

[http://www.garrigues.com/sites/default/files/docs/Novedades-Mercantil-Litigacion-2-2013\\_0.pdf](http://www.garrigues.com/sites/default/files/docs/Novedades-Mercantil-Litigacion-2-2013_0.pdf) [Accessed June 7, 2016].

Lejeloven, 2016. Lejeloven (Rent Act), Available at:

<http://www.themis.dk/synopsis/docs/lovsamling/lejeloven.html>.

Lewis, J. & Smith, L., 2013. Breaking Barriers: An industry review of the barriers to Whole House Energy Efficiency Retrofit and the creation of an industry action plan, London. Available at:

[http://www.nef.org.uk/themes/site\\_themes/agile\\_records/images/uploads/BreakingBarriers\\_SummaryReport.pdf](http://www.nef.org.uk/themes/site_themes/agile_records/images/uploads/BreakingBarriers_SummaryReport.pdf) [Accessed June 7, 2016].

- LOE, 1999. Building Requirements Law of November, 5th, in BOE num 266 of 6/11/1999 (Ley 38/1999 de Ordenación de la Edificación), Available at:  
<http://www.boe.es/buscar/pdf/1999/boe-a-1999-21567-consolidado.pdf>.
- Loi de transition énergétique, 2014. Compteurs individuels obligatoires pour l'eau et le chauffage, Available at: <http://www.lenergiesoutcompris.fr/actualites-et-informations/politique-energetique/compteurs-individuels-obligatoires-pour-l-eau-et-le-chauffage-deputes-et-senateurs-s-accordent-47620>.
- LPH, 1960. Ley 49/1960, de 21 de Julio, Sobre Propiedad Horizontal, Available at:  
<https://www.boe.es/boe/dias/1960/07/23/pdfs/A10299-10303.pdf>.
- LPHR, 1999. Ley 8/1999, de 6 de abril, de Reforma de la Ley 49/1960, de 21 de julio, sobre Propiedad Horizontal, Available at: <http://www.boe.es/buscar/doc.php?id=BOE-A-1999-7858>.
- Lund, H. & Mathiesen, B. V., 2009. Energy system analysis of 100% renewable energy systems- The case of Denmark in years 2030 and 2050. *Energy*, 34(5), pp.524–531.
- Mathiesen, B.V. et al., 2015. IDA's Energy Vision 2050: A smart energy system strategy for 100% renewable Denmark, Available at: [http://www.energyplan.eu/wp-content/uploads/2015/11/Executive-Summary\\_\\_IDAs\\_Energy\\_Vision\\_2050.pdf](http://www.energyplan.eu/wp-content/uploads/2015/11/Executive-Summary__IDAs_Energy_Vision_2050.pdf) [Accessed June 7, 2016].
- Ministère du Logement et de L'habitat Durable, 2016a. L'éco-prêt à taux zéro « copropriétés ». Available at: <http://www.logement.gouv.fr/l-eco-pret-a-taux-zero-coproprietes> [Accessed June 6, 2016].
- Ministère du Logement et de L'habitat Durable, 2016b. Plan de rénovation énergétique de l'Habitat, Ministère du Logement, Available at: <http://www.logement.gouv.fr/le-plan-de-renovation-energetique-de-l-habitat>.
- Ministry of Economy, 2009. Energy Policy of Poland until 2030: Appendix to Resolution no. 202/2009 of the Council of Ministers of 10 November 2009, Available at:  
[http://climateobserver.org/wp-content/uploads/2014/09/Poland\\_EPP-2030-2009.pdf](http://climateobserver.org/wp-content/uploads/2014/09/Poland_EPP-2030-2009.pdf) [Accessed June 7, 2016].
- Ministry of Infrastructure and the Environment, 2013. Klimaatagenda: weerbaar, welvarend en groen, Available at:  
<https://www.rijksoverheid.nl/onderwerpen/klimaatverandering/documenten/rapporten/2013/10/04/klimaatagenda-weerbaar-welvarend-en-groen>.

- Ministry of the Interior and Kingdom Relations, 2011. Plan of Action Energy Saving in Built Environment, Available at: <https://www.government.nl/documents/reports/2011/02/25/plan-of-action-energy-saving-in-built-environment>.
- MMM, 2016. Meer Met Minder Energie. Available at: <http://www.meermetminder.nl/52/energie-besparen-met-mmm/maatregelen.html> [Accessed June 6, 2016].
- MPO, 2014. National Energy Efficiency Action Plan of the Czech Republic on energy efficiency, Available at: [https://ec.europa.eu/energy/sites/ener/files/documents/NEEAPCzechRepublic\\_en2014.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/NEEAPCzechRepublic_en2014.pdf) [Accessed June 7, 2016].
- Muusmann, N.K., 2015. Speciale skrivning – Baeredygtigheds udvikling i Danmark, Available at: [https://www.ucviden.dk/student-portal/files/33163779/Speciale\\_Niklaes\\_Muusmann.pdf](https://www.ucviden.dk/student-portal/files/33163779/Speciale_Niklaes_Muusmann.pdf) [Accessed June 7, 2016].
- Nieboer, N. et al., 2011. Energy efficiency in housing management – conclusions from an international study. In 23rd Conference of the European Network for Housing Research ENHR, Toulouse, July 5-8, 2011. pp. 1–13.
- Notaires de France, 2015. La valeur verte des logements. Available at: <http://www.notaires.fr/fr/la-valeur-verte-des-logements> [Accessed June 6, 2016].
- Ofgem, 2016. Energy Company Obligation. Available at: <https://www.ofgem.gov.uk/environmental-programmes/eco> [Accessed June 6, 2016].
- Outrequin, P. et al., 2008. programme of actions towards a factor 4 in existing social housings in Europe: Barriers analysis for social housing energy retrofitting towards a factor 4 and for the life cycle cost analysis use [www.suden.org](http://www.suden.org), Available at: [https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/factor\\_4\\_barriers\\_analysis.pdf](https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/factor_4_barriers_analysis.pdf) [Accessed June 7, 2016].
- Pfliegner, K. et al., 2012. Climate and Energy Policy in Germany: Mechanisms to Encourage Private Sector Investment/Participation in Low-Carbon Development -A case-study of Germany's Building Sector., Frankfurt. Available at: [https://www.oecd.org/env/cc/Case study Germany.pdf](https://www.oecd.org/env/cc/Case%20study%20Germany.pdf) [Accessed June 7, 2016].
- PGE, 2016. Ministerio de Hacienda, Presupuestos Generales del Estado 2016, Available at: <http://www.sepg.pap.minhap.gob.es/sitios/sepg/es-ES/Presupuestos/ProyectoPGE/Paginas/ProyectoPGE2016.aspx>.

- Power, A. & Zulauf, M., 2011. Cutting Carbon Costs: Learning from Germany's Energy Saving Programme, London. Available at: <http://sticerd.lse.ac.uk/dps/case/cp/CCCfull.pdf> [Accessed June 7, 2016].
- PwC, 2010. Institutional Rental Market in Poland An emerging market in the residential sector, Available at:  
[https://www.pwc.pl/pl/publikacje/assets/reas\\_cms\\_pwc\\_institutional\\_rental\\_market\\_poland.pdf](https://www.pwc.pl/pl/publikacje/assets/reas_cms_pwc_institutional_rental_market_poland.pdf) [Accessed June 7, 2016].
- RE-CE, 2013. Real Decreto 235/2013, de 5 de abril, por el que se aprueba el procedimiento básico para la certificación de la eficiencia energética de los edificios, Available at:  
<https://www.boe.es/buscar/act.php?id=BOE-A-2013-3904>.
- REE, 2015. Rehabilitación Energética de Edificios (Programmea PAREER-CRECE), Plan de Acción 2014-2020 para la rehabilitación Energética de Edificios existentes, IDAE. Available at:  
[http://www.idae.es/uploads/documentos/documentos\\_Resol\\_DG\\_fin\\_registro\\_solicitudes\\_PA\\_REER\\_CRECE\\_35145e87.pdf](http://www.idae.es/uploads/documentos/documentos_Resol_DG_fin_registro_solicitudes_PA_REER_CRECE_35145e87.pdf) [Accessed June 7, 2016].
- Rijksdienst voor Ondernemend Nederland, 2016. VerbeterUwHuis. Available at:  
<https://www.verbeteruwhuis.nl/> [Accessed June 6, 2016].
- RRRU, 2013. Ley 8/2013, de 26 de junio, de rehabilitación, regeneración y renovación urbanas, Available at: <https://www.boe.es/buscar/pdf/2013/BOE-A-2013-6938-consolidado.pdf>.
- State Environmental Fund of the Czech Republic, 2016. Zelená úsporám - Aktuality. Available at:  
<http://www.zelenausporam.cz/sekce/193/aktuality/> [Accessed June 6, 2016].
- Wardal, K. et al., 2015. Putting energy efficiency first- Addressing the barriers to energy efficiency: Analysis of the National Energy Efficiency Action Plans in the context of Article 19 of EU Energy Efficiency Directive, Available at: [http://www.efiees.eu/public/20150923\\_Putting EE1 Addressing barriers EED Art 19 FINAL.pdf](http://www.efiees.eu/public/20150923_Putting EE1 Addressing barriers EED Art 19 FINAL.pdf).
- Weevers, B. & Go, K., 2010. Energiebesparing en huurverhoging De barrières voorbij 3rd ed. M. V. C. Dijkhuis, ed., Available at:  
[http://energielinq.nl/uploads/attachment/file/0/10/13\\_de\\_barrieres\\_voorbij-1395930742.pdf](http://energielinq.nl/uploads/attachment/file/0/10/13_de_barrieres_voorbij-1395930742.pdf) [Accessed June 7, 2016].