

Overcoming the split incentive barrier in the private rental market

International Case Studies

February 2019

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This document was produced by the Irish Green Building Council with the support of SEAI RD&D programme (18/RDD/283). It includes case studies of initiatives taken in other jurisdictions to mitigate the split incentive issue in the private rental market. The implications of these findings for Ireland will be further discussed at a workshop in Dublin on Friday 1st March 2019.

For further information on this project, please visit www.igbc.ie or contact Marion@igbc.ie.

SUMMARY

Improving the energy efficiency of our buildings is a key part of reducing our carbon emissions. Although progress has been made in accelerating energy renovation in Ireland, there is a large gap between the actual and required level of investment.

There is a very significant level of untapped energy saving potential in the rental sector¹ and the “split incentive” problem proves a very strong barrier to action. This problem arises when the tenant pays the operating costs for the space (e.g. the electric bill), while the landlord pays the capital costs for the building: The owner wants to minimize capital costs, maximize rental revenues, and has no incentive to invest more up-front in measures that would improve efficiency (i.e. reduce the electricity bill) over time if the tenant is the one paying for it.

A wide variety of policy responses exist globally that attempt to address split incentive problems. These include information tools such as energy labelling and individual metering, financial incentives, contractual approaches - e.g. green leases, and regulatory solutions such as minimum thermal efficiency performance standards.

Energy labelling has been mandatory for homes and commercial buildings offered for rental or for sale in Ireland since 2009. Several support schemes are also available to landlords willing to invest in the energy efficiency of their properties. Almost all research finds a positive effect of energy ratings on rental rates in the commercial and residential sectors in Ireland. However, in both sectors, the levels of mark-ups are generally not enough to fully recover investment costs and the effect of the energy rating is stronger in weaker selling conditions..

As the government currently considers regulation of minimum thermal efficiency for rental properties, this report reviews ten contractual and regulatory approaches used in Europe and beyond to tackle the split incentive issue.

- **Commercial Properties**

Regulatory and contractual approaches are used to tackle the split incentive issue in the commercial sector.

Regulatory approaches include [minimum thermal efficiency standards](#) (e.g. England and Wales, the Netherlands) and [mandatory energy renovation action plan](#) (e.g. Scotland). To give time to landlords and investors to adjust, changes in minimum thermal efficiency standards have been announced far in advance and introduced gradually. Furthermore, exemptions exist, and financial incentives are usually introduced alongside these pieces of legislation. As these are relatively new, it is not possible to assess their full impact yet. Enforcement also seems to be a big challenge. However, evidence collected by local green building councils suggest that investors and mortgage-banks already discriminate against poor-rated buildings within their portfolio strategies and seek to divest of stock that is either at risk or fails to meet the standards.

Contractual approaches such as green leases are also quite common in the commercial sector. A green lease is a standard commercial lease with additional clauses included which provide for the management and improvement of the Environmental Performance of a building by both owner and

occupier(s). Green leases are now relatively common in the [UK, the US and Australia](#), where the Better Building Partnership¹ has developed considerable resources around them. Green leases are usually voluntary, except for example for some commercial buildings in [France](#) and [government's buildings in Australia](#). Research shows that green leases contribute to greater environmental awareness. However, actions taken as part of green leases can usually be described as “light green” (e.g. changing the lighting to LED) as opposed to “dark green” (e.g. deep retrofit). Although green leases are applicable in concept to any rented property, large or small, their diffusion across the market, where non-mandatory, is uneven. The organisations adopting green leases in the UK and the US are mainly the same type that are likely to participate in other forms of voluntary environmental programmes, i.e. large organisations with sustainable goals.

- Residential Properties

In the residential sector, two main types of legislation have been introduced to-date to tackle this issue: [Minimum thermal efficiency standards](#) and [minimum ceiling and underfloor insulation](#).

The minimum standards introduced so far have been relatively low but are due to increase gradually in the next decade. To give time to landlords and investors to adjust, changes have been announced far in advance (3-8 years) and introduced gradually. Exemptions usually exist and these new pieces of legislation have been introduced alongside public education campaigns, guidelines, and financial support. Local authorities are generally in charge of enforcement, which can be challenging due to a lack of resources. However, these legislations have contributed to energy efficiency awareness raising and investors have started to discriminate against poor-rated buildings within their portfolio strategies and seek to divest of stock that is either at risk or fails to meet the standards.

¹ The Better Building Partnership is a coalition of leading commercial property owners who are working together to improve the sustainability of existing commercial building stock.

INTRODUCTION

Buildings are directly responsible for 40% of energy use in Ireland and are major emitters of carbon. With the nearly Zero Energy Building standards gradually coming into force this year, most new buildings developed today are highly energy efficient. Yet, as many as one million Irish homes are considered significantly energy inefficient and require upgrade work between now and 2050ⁱⁱ.

Upgrading our buildings so that they use less energy is one of the most cost-effective ways to reduce Ireland's greenhouse-gas emissions. Building renovation also has several side effects, often yielding substantial benefits – environmental, economic and social. These co-benefits can accrue to the building users (e.g. increased comfort and better health) but also to society (e.g. job creation and energy security).

Although progress has been made in accelerating energy renovation in Ireland, it is widely accepted that there is a large gap between the actual and required level of investment. The split incentive between tenants and landlords is one of the most acute and persistent barriers to unlocking the potential of energy efficiency in buildings. This is a common situation whereby a landlord is responsible for meeting the cost of improvement work, but only receives a benefit when the work increases the rental or re-sale value of the property. The tenant, who is typically responsible for paying the energy bills and would thus benefit from lower energy costs, is unlikely to invest in the work without certainty that they will remain in the property long enough that the savings will outweigh the investment.

In this context, the aim of this report is to provide an overview of international best practices to mitigate the split incentive issue in the private rental market, and to open discussion on potential actions which could be taken in Ireland to address this issue. The implications of these findings for Ireland will be further discussed at a workshop in Dublin on Friday 1st March 2019.

The introduction provides an overview of existing initiatives to tackle the split incentive issue in Ireland, as well as an overview of Ireland's rental property market (commercial and residential).

Sections 2, 3 and 4 present some of the regulatory and contractual approaches which have been taken in other jurisdictions to tackle the split incentive issue in the residential and commercial sectors, and how they could potentially be implemented in Ireland.

Existing Initiatives in Ireland

Tackling this issue has been high on the EU agenda for the last 15 years. Both the [Energy Efficiency Directive](#) and the [Energy Performance of Building Directive 2018 recast](#) directly address the barrier of split incentives in the building sector.

Article 19(1)(a) - [Energy Efficiency Directive](#)

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: (a) the split of incentives between the owner and the tenant of a building or among owners, 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, including national rules and measures regulating decision- making processes in multi- owner properties.

[Energy Performance of Building Directive 2018 recast](#)

Member States should provide clear guidelines and outline measurable, targeted actions as well as promote equal access to financing, including for the worst performing segments of the national building stock, for energy-poor consumers, for social housing and for households subject to split-incentive dilemmas, while taking into consideration affordability. To further support the necessary improvements in their national rental stock, Member States should consider introducing or continuing to apply requirements for a certain level of energy performance for rental properties, in accordance with the energy performance certificates.

Article 2a (d) the long-term national renovation strategy, must include *an overview of policies and actions to target the worst performing segments of the national building stock, split-incentive dilemmas and market failures, and an outline of relevant national actions that contribute to the alleviation of energy poverty.*

The introduction of mandatory Building Energy Rating (BER) for properties offered for rental or for sale in January 2009ⁱⁱⁱ, followed by the obligation to state it in the advertisement of a property for rent or sale in 2013^{iv} aimed at increasing transparency in the market for building occupiers, investors and tenants. With an energy efficiency rating system, agents looking to rent can identify the energy performance of buildings which would otherwise be unknown. Provided consumers value energy efficiency, for comfort gains, monetary savings through reduced energy usage, environmental concerns or otherwise, this should lead to an increase in demand for more energy efficient properties.

BER and Rental Prices

Although there is no consensus on the scale of the effect, almost all research finds a positive effect of energy ratings on property prices and rental rates in the commercial property sector^v.

A positive relationship between energy ratings and rental prices also holds in the residential sector. A 2013 study shows that each decline in energy efficiency along the BER scale is associated with a decline in rental price of 0.5%. According to this study, relative to D-rated properties A-rated properties receive a rental price premium of just under 2%^{vi}. A 2018 study shows that up to half of rental tenants in Ireland are willing to pay more for properties with higher levels of energy efficiency^{vii}. According to this study, in the absence of information tenants overvalue energy efficiency labels.

However, in both commercial^{viii} and residential^{ix} sectors, the effect of the energy rating is stronger where selling conditions are worse. Furthermore, the levels of mark-ups are generally not sufficient to fully recover investment costs^x.

Support Schemes

The following support schemes are currently available to landlords willing to invest in the energy efficiency of their properties.

The [Home Renovation Incentive \(HRI\)](#) is a relief from Income Tax for homeowners, local authority tenants and landlords. The HRI Tax Credit can be claimed for repairs, renovations and improvements including improvements that deliver energy efficiencies to homes and/or rental properties.

The [Living City Initiative \(LCI\)](#) is a tax incentive scheme for Special Regeneration Areas (SRA) in: Cork Dublin Galway Kilkenny Limerick Waterford. Three types of relief are available under this scheme: Owner-occupier residential, rented residential (landlord) and commercial relief.

SEAI's [Better Energy Homes](#) and [Better Energy Communities](#) schemes are available to landlords. However, in practice the split incentive has limited take-up of these schemes by landlords^{xi}.

Planned Consultation

In 2016, the government committed to launch a public consultation process on the establishment of minimum energy efficiency standards in the rented sector. It is intended that these regulations will only come into place post-2020 and will apply to new leases rather than existing ones^{xii}. As part of this process, the Department will also seek views on the options for support schemes that could help landlords to make the investments necessary to improve the energy efficiency of their properties in the period before the changes are introduced.

This document is intended to be used to inform this consultation.

Ireland's Rental Property Market

The following characteristics of the Irish residential and commercial rental market are significant to this matter.

Residential

Ireland's rate of homeownership peaked at 80% of households in 1991. By 2016, owner-occupation had fallen to 67.6%, while 20.2% of households rented from a private landlord and 8.85% rented from a local authority. Renting now accounts for 36% of tenure status in urban towns and cities^{xiii}.

Approximately 20% of rented dwellings have a BER of F or G, compared to the overall housing stock where 15% of properties have a BER of F or G. Over 55% of private rented dwellings have a BER of D or lower^{xiv}. This implies that people in rented properties are at a significantly higher risk of fuel poverty than people living in owner occupied or local authority homes^{xv}. The rental sector is hence an important area to tackle for alleviating energy poverty.

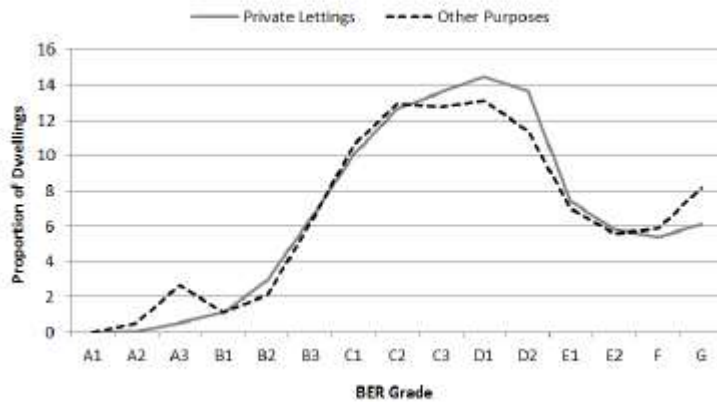


Figure 1: Proportional distribution of Irish Building Energy Ratings - Collins, M, Curtis, J. 2017

Studies by the National Economic and Social Council (NESC) have suggested that by European standards, the Irish property sector is comprised of a large number of small landlords. Residential Tenancies Board (RTB) data show that 86% of landlords own two properties or less, with 70% of them only managing one tenancy^{xvi}. The Central Bank also reports that buy-to-let mortgages are particularly prevalent in Ireland, with nearly half of all rented properties under mortgage. Although small, the build-to-rent sector has grown significantly in the last decade and accounted for 25% of investment in Ireland in the first half of 2018^{xvii}.

In private rented accommodation, the average duration of tenancy is 3 years 4 months^{xviii}.

Rents across the country, particularly in Dublin, the Greater Dublin Area (GDA), and other cities have increased significantly over the last few years. Average annual rental growth rates for 2016 were 7.8%^{xix}, compared to an average increase in average weekly earnings of 0.95%^{xx}. In a market with increasing rental prices, both landlords' and tenants' decisions may be affected: Landlords' rental income increases irrespective of housing quality and some landlords may be less inclined to invest in energy efficiency upgrades. Upward pressure on rental prices will diminish tenants' willingness-to-pay for improved energy efficiency, as higher rent costs will reduce their ability to pay^{xxi}.

Under the Planning and Development (Housing) and Residential Tenancies Act 2016^{xxii} rent increases are capped at 4% per year for the next 3 years in designated Rent Pressure Zones.

Commercial

There are circa 109,000 commercial buildings in Ireland. Three quarter of which are either retail or offices. Modelling indicates a primary energy demand in the commercial sector of around 18 Terawatt Hours (TWh). Among all sectors "Retail" has the highest energy demand at around 7 TWh, followed by "Offices", "Hotel" and "Restaurant/Public House".

Ireland has a relatively unsophisticated commercial buildings stock, and a high incidence of buildings in which relatively basic upgrades could lead to significant energy savings^{xxiii}.

A large proportion of occupiers is tenants. Furthermore, the commercial sector has a much higher rate of multi-tenanted leasing situation comparing to residential sector (50-70% vs. 25% in EU)^{xxiv}. Tenants who lack decision-making power are significantly less likely to investigate energy renovation options^{xxv}.

Rent increases are expected in all sectors of the commercial property market across the country this year, with the office sector proving the most successful performing commercial property sector. However, there is a wide rental imbalance between Dublin and the rest of the country. Prime retail rents in Dublin are €6,000 per square metre, over six times the national average and prime office rents are €638 per square metre, over three times the national average. At the other end of the scale, Sligo has the highest commercial vacancy rates in the country at 18.7% - Nationally, vacancy rates for commercial properties is 13.3%^{xxvi}.

INTERNATIONAL CASE STUDIES: COMMERCIAL SECTOR

The aim of this section is to explore regulatory and contractual approaches which have been taken in Europe and beyond to tackle the split incentive issue in the commercial sector.

Regulatory Schemes

Minimum energy performance in rented units



England & Wales

Under the [Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015](#), landlords of privately rented non-domestic property in England or Wales must ensure that their properties reach at least an EPC rating of E before granting a new tenancy to new or existing tenants². A 2017's report showed that as much as 20% of commercial properties in the UK could fail to meet the standard^{xxvii}. These requirements will apply to all private rented properties in England and Wales – even where there has been no change in tenancy arrangements from 1 April 2023 for non-domestic properties.

Supporting measures

To give time to landlords and investors to adjust, the measures were first announced (without details) in 2011 and are being gradually introduced between 2018 and 2023.

Furthermore, landlords may be able to claim exemptions from this prohibition:

- If the landlord can show that the cost of purchasing and installing a recommended improvement or improvements does not meet a simple 7-year payback test. Validity: 5 years.
- Where a landlord has made all the 'relevant energy efficiency improvements' that can be made (or there are none that can be made), and the property remains below EPC E. Validity: 5 years.
- Walls insulation exemption: A recommended energy efficiency measure is not considered to be a relevant measure where it is cavity wall insulation, external wall insulation or internal wall insulation (for external walls), and where the landlord has obtained written

² Or demonstrate they have installed all relevant measures, even if this doesn't get the property up to E.

expert advice indicating that the measure is not appropriate for the property due to its potential negative impact on the fabric or structure of the property (or the building of which the property forms a part). The expert advice must be obtained from one of the following independent experts: An architect registered on the Architect Accredited in Building Conservation register; a chartered engineer registered on the Institution of Civil Engineers' and the Institution of Structural Engineers' Conservation Accreditation Register for Engineers; a chartered building surveyor registered on the RICS's Building Conservation Accreditation register, a chartered architectural technologist registered on the Chartered Institute of Architectural Technologists' Directory of Accredited Conservationists. Validity: 5 years.

- Third party consent exemption: Depending on circumstances, certain energy efficiency improvements may legally require third party consent before they can be installed in a property. Where third party consent is required for a particular measure the landlord must identify this requirement and make and be able to demonstrate to enforcement authorities on request, 'reasonable effort' to seek consent. Validity: Generally, 5 years, but where improvements cannot be made because consent could not be obtained from the current tenant of the property, the exemption will only remain valid for as long as that tenant remains the tenant.
- 'Devaluation' Exemption: An exemption from meeting the minimum standard applies where the landlord has obtained a report from an independent surveyor who is on the RICS register of valuers advising that the installation of specific energy efficiency measures would reduce the market value of the property, or the building it forms part of, by more than 5%. Validity: 5 years.
- 'New Landlord' Exemption: The Regulations acknowledge that there are some, limited circumstances where a person may have become a landlord suddenly and as such it would be inappropriate or unreasonable for them to be required to comply with the Regulations immediately. Validity: 6 months.

All exemptions must be published in the PRS Exemptions Register and can be checked by prospective tenants.

Enforcement and compliance

The new regulations are enforced by Local Weights and Measures Authorities. Financial penalties of up to £150,000 per property, and per breach of the Regulations apply. Furthermore, information on the penalty will be published for up to 12 months on the PRS Exemptions Register.

Impact to-date

As the first part of the regulation only came into force on 1st April 2018, no quantitative analyses of the impact are available yet.

Anecdotal evidences collected by the UKGBC suggest that investors already discriminate against poor-rated buildings within their portfolio strategies and seek to divest of stock that is either at risk or fails to meet the standards. The biggest impact so far has been on large landlords and investors, who have significantly improved / sold their lowest quality stock over the last 5 years. However, many smaller landlords have done little to improve their stocks. This can be explained by the low level of enforcement to-date as the commercial sector is often not seen as the main priority for local authorities with limited resources.

The impact of the regulations will be reviewed first in 2020 by the Secretary of State, and every 5 years thereafter.



The Netherlands

As of the 1st January 2023, office buildings in the Netherlands will be required to have an energy label of C or better. This means that approximately 38% of all registered office buildings in this country must be upgraded between now and 2023 to meet the new requirements.

The Dutch government is looking at increasing this minimum standard gradually to reach A rating by 2030, and at introducing a new framework in future which would be based on the measured energy consumption in kWh/m² as opposed to EPC^{xxviii}. Similar regulatory changes are also expected in the retail, industrial and hotel sectors in the coming years^{xxix}.

Supporting measures

To give time to landlords to adjust to these new requirements, the prohibition was announced in early 2018.

Furthermore, exemptions exist for:

- Buildings with an office function < 50%
- Offices buildings with a total size of <100 m²
- The building is considered a national monument
- The building is selected for demolition, disownment or planned for transformation within 2 years
- The costs of upgrading cannot be recouped within ten years. In this specific case, the landlord is required to only implement measures that can be earned back in 10 years - even if that would mean the C-label is not achieved.

Financial incentives are also in place. For instance, office building owners can make use of the existing subsidy schemes. E.g. Up to 55% (2017) of investments in energy efficiency improvements may be deducted from taxable profit provided that the type of investment is included on the list of improvements published by the Government. The Dutch government also issues 'green statements', which allow lenders to pass on discounts on loan interest rates.

Enforcement and compliance

The new regulation will be enforced by municipalities. Penalties for non-compliance may include a government order to cease the use of the building.

Impact to-date

Although the legislation will only come into force in 2023, the number of investors, mortgage-banks, owners and occupiers asking for more detailed information about buildings' energy performance is rising. Furthermore, a significant increase in investment in the renovation and transformation of commercial properties have been observed. Many institutional investors have already achieved a minimum rating of C or will account for the changing legislation by adjusting their capital expenditure budgets. A growing number of financial institutions are also adapting their real estate financing measures accordingly. For instance, ING, Rabobank and ABN AMRO, two leading financial institutions in the Netherlands, have indicated they will stop financing office buildings with a D label or worse. Additionally, ING Real Estate Finance is no longer refinancing clients lacking a plan to get at least a C label for their office.

However, smaller, non-institutional investors who are largely situated in suburban areas and have invested in low-grade properties may decide to sell or hold the vacant investment until the necessary funds are acquired.

Other regulatory initiatives



Scotland

Under the [Assessment of Energy Performance of Non-domestic Buildings \(Scotland\) Regulations 2016](#), where an owner of a commercial property >1000m² wants to sell or lease a property, an action plan must be provided to the prospective tenant or buyer at the seller's expense. The action plan must include a programme of improvement measures to enhance the energy efficiency of the building and recommendations must be implemented within 3.5 years.

The owner and the tenant are free to decide the extent to which any works set out in an action plan are to be carried out, or paid for, by the tenant. However, notwithstanding any contractual arrangement between a landlord and tenant, the Regulations state that responsibility for compliance ultimately falls upon the owner of the building.

Supporting measures

The improvement measures are only mandatory where the energy savings over a period of 7 years exceed the preliminary cost of the works, or if a boiler is over 15 years old.

Building owners can defer the implementation of the action plan by arranging to record and report operational energy ratings (logging actual emissions and energy use via a Display Energy Certificate) on an annual basis.

Exemptions:

- Buildings constructed to the 2002 building standards or more recent standards, and pre 2002 buildings that have been built to or improved to meet more recent energy standards.
- Temporary buildings with a planned time of use of 2 years or less.
- Workshops and non-residential agricultural buildings with low energy demand.
- The sale or lease of a building at any time before the construction of the building has been completed.
- The renewal of an existing lease with the same tenant.
- The grant of a "short term lease" (i.e. no more than 16 weeks and with no option to extend the duration) where the building has not been let by the owner during the preceding 36 weeks.

A variety of support are provided to owners and occupiers of non-domestic buildings in the public and private sectors to encourage them to make energy efficiency improvements.

Enforcement and compliance

Local authorities are responsible for enforcement of the Regulations, and have power to impose a penalty charge of £1000 for failure to comply.

Impact to-date

Properties with floor area >1000m account for 57% of the total floor space of non-domestic buildings in Scotland.

The Scottish government is reviewing the current assessment process to identify where change is needed to support further regulation. In particular, they want to ensure that the assessment allows building owners to better understand the energy performance of their building, how it can be improved and how the building compares to a typical or very efficient example of the same type.



The Netherlands

Beside the introduction of the minimum energy label of C or better for all office buildings as of the 1st January 2023, the Netherlands have introduced further requirements under the [Environmental Management Activities Decree](#) to tackle the split incentive issue in the commercial sector.

Under this regulation, the “operator” of 20 types of “establishment” (public and private) with an electricity consumption in any calendar year over 50,000 kWh or a consumption of natural gas equivalents in any calendar year over 25,000 m³ must implement all energy efficiency measures with a payback inferior to 5 years.

To make the process easier an indicative list of measures with a payback inferior to 5 years was published for the [20 types of “establishments”](#).

The Decree and the obligation to save energy applies to 'establishments' and places the responsibility to save energy with the 'operator of the establishment'. This means that in the rental market it can be difficult to establish whom (tenant or owner) is responsible for taking actions. Although the guidelines [include recommendations](#) on who should take actions depending on the specific situation, this has given rise to some controversy. The Dutch Green Building Council is now working on a proposal to clarify this issue, by making one party (likely to be different for different sectors) responsible for energy saving.

Supporting measures

Some [exemptions](#) exist, including for establishments with an annual electricity consumption of less than 50,000 kWh and an annual consumption of natural gas equivalents of less than 25,000 m³.

The operator can also ask for a phased implementation of the energy measures. To approve/reject the requested phased implementation the competent authority will look at operator’s economic circumstances and at “natural” maintenance and renovation moments. Municipalities are officially the competent authorities, but most regions have regional environmental service (*Milieudienst*) which support them with audit and enforcement.

Enforcement and compliance

If it is plausible that all energy efficiency measures with a payback inferior to 5 years haven’t been taken, the competent authority may carry out an investigation. If the investigation confirmed that the measures haven’t been taken, the competent authority shall ask the operators to take action within a reasonable period.

Impact to-date

The enforcement to date has been low. To strengthen enforcement, as from July 1st, 2019, all users /tenants will have to submit an environmental report (*Wet Milieubeheer*) to the municipality covering all processes in the part of the building they occupy.

Contractual Approaches: Green leases

A green lease is a standard commercial lease with additional clauses included which provide for the management and improvement of the Environmental Performance of a building by both owner and occupier(s). Green Leases are a tool for engagement between landlords and tenants to facilitate the better sharing of data on the operation of the building. These can range from legally enforceable lease clauses which are integrated into the lease, to non-legally binding Memorandums of Understanding (MoUs) between the parties.

Although there are various sets of green model clauses, there is no international standard definition of what a 'green lease' should be or do. A 'green lease' can contain anything from a single 'light green' clause (e.g. a very general duty to cooperate on environmental matters) to more ambitious, 'dark green' clauses (e.g. setting specific environmental rating targets).

Except for [France](#) and [government's buildings in Australia](#), green leases are usually voluntary. However, these are relatively common in the UK, the US and Australia, where the Better Building Partnership has developed considerable [resources around Green leases](#).

Voluntary green leases

Despite the potential strength of private-private contracts^{xxx} and the existing role of leases as a 'local law' between two parties, many "green" clauses may be difficult to enforce and often have a relatively low level of ambition^{xxxi}.

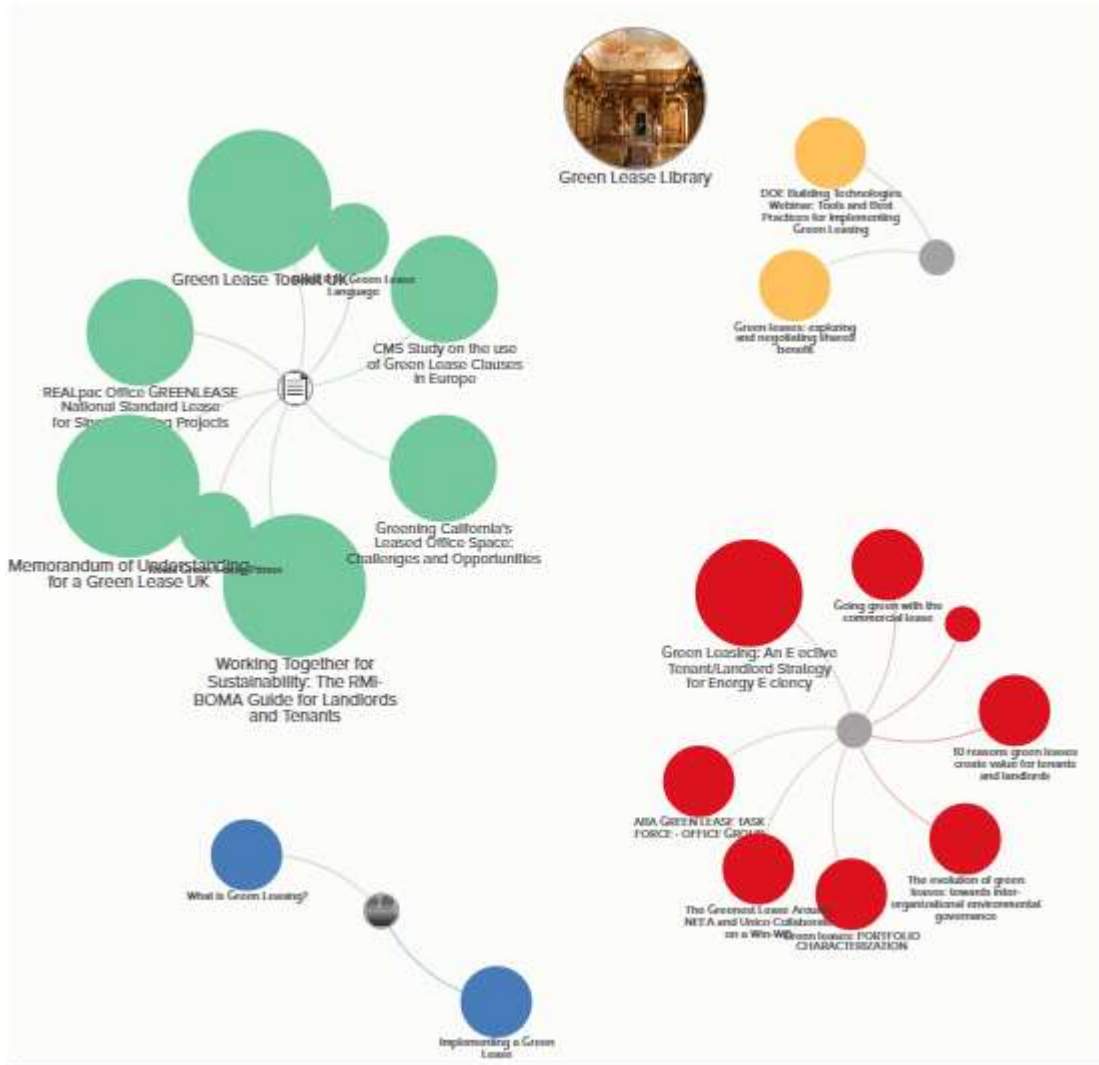
Duties to exercise 'reasonable endeavours' and to 'co-operate', lack specificity and it may be hard to prove breach. Interviewees in the WICKED research project in the UK commented that parties are unlikely to seek legal enforcement and that it is not unusual for lease clauses not to be enforced^{xxxii}.

The impact of green leases is difficult to quantify. However, they facilitate useful conversations about cooperation between tenant and landlord on environmental matters^{xxxiii}.

Although green leases are applicable in concept to any rented property, large or small, their diffusion across the market is uneven. The organisations adopting green leases in the UK and Australia are mainly the same type that are likely to participate in other forms of voluntary environmental programmes, i.e. large powerful organisations with sustainability goals, in markets that are facing regulation^{xxxiv}. Corporate responsibility also acts as a major driver for these organisations^{xxxv}.

Given the evidence available, wider uptake in non-prime properties or amongst smaller landlords and tenants seems unlikely. The evidence to date in the UK and Australia suggests that voluntary green leases may provide a 'necessary but not sufficient' function in tenanted commercial property^{xxxvi}.

Please visit the [IGBC's Green Lease Library](#) for further information on these resources:



Mandatory Green leases



France

Since July 2013, all new and existing leases for offices or retail units over 2,000 square metres must include an environmental appendix - [loi Grenelle II](#).

Under this act, the owner and tenant must share information on:

- Heating, cooling, ventilation and lighting equipment, as well as any other systems that impact energy consumption;
- Actual annual water and energy consumption;
- Amount of waste generated annually by the building, and how this is treated.

and implement an action plan, which should include energy saving targets as well as information

on cost-sharing. Landlords may require tenants to reduce or limit their energy consumption. E.g. through improvement or maintenance work, or water savings. The lease may also include a commitment to results.

Supporting measures

Exemptions exist for:

- Offices or retail units with a total size of <2000 m²
- All commercial buildings with a total size of >2000 m², but sub-divided into smaller independent offices or retail units. E.g. many shopping centres.

Enforcement and compliance

No sanctions for not including any environmental appendix into a lease.

Impact to-date

Direct impact on energy savings has been limited to-date as

- Many offices and retail units have a total size of <2000 m². E.g. In the Paris area, 96% of the retail units have a total size of <300 m².
- The success of the environmental appendix totally depends on the willingness of landlords and tenants – e.g. the targets they set, the action plan they develop and implement.
- Most actions taken to date under this act could be described as “light green” - E.g. Changing the lighting to LED, adjusting lighting, heating and air conditioning systems according to actual occupancy - as opposed to “dark green” measures such as deep retrofit.

However, it has contributed to greater environmental awareness and better data sharing on the operation of the building among landlords and tenants. It is likely that overtime environmental appendix will become mandatory for smaller units and that penalties for non-compliance are introduced.



Australia

All government's* lease agreements and MoUs for new office buildings, major refurbishments and new leases > 1000 m² and longer than 2 years must include:

- a mutual obligation to achieve and maintain the relevant Australian Building Greenhouse Rating (ABGR) or [equivalent performance standard](#);
- annual ABGR performance validation by an independent assessor;
- separate on market status digital metering of tenanted areas and central;
- establishment of a formal management committee comprising both tenant and building owner representatives;
- development of an Energy Management Plan outlining minimum procedures required to maintain the relevant performance standard;
- remedial action/dispute resolution clauses.

To facilitate implementation and ongoing compliance with the [relevant energy performance standard](#), Green Lease Schedule (GLS) templates were designed. The essential elements of a GLS are: 1. agreed target ABGR or equivalent performance standard (including annual assessment); 2. separate digital on market status metering; 3. building management committee (BMC); 4. energy management plan (EMP); and remedial action/dispute resolution clauses.

*Applies to all Australian Government departments and agencies.

Supporting measures

Green Lease Schedule (GLS) and Energy Management Plan (EMP) templates were developed, as well as:

- Toolkits providing a menu of 'green clauses' that parties can elect to include in leases and that provide a framework 'for sustainable operations and collaboration throughout the life of commercial leases right from the on-set'.
- [Tenant's Guide to Green Leases](#)
- [Green Lease handbook](#)
- [Negotiating Green Leases - Case Studies](#)

Impact to-date

The initiative was initiated by government. However, the [Energy Efficiency in Government Operations \(EEGO\) policy standards – 2006](#), encourage the private sector to adopt a similar approach and to use the resources provided. Since then, the number of green leases (including through the work of the [Better Building Partnership](#)) has significantly increased in the private sector in Australia. It is for instance part of the Commonwealth Bank Place (the largest commercial office development in Sydney), and of some listed buildings' leases – e.g. the Perpetual Building.

The [extensive evaluation of the green lease programme conducted by the Australian Government in 2017](#) found that the adoption of green leases:

- Has contributed to an improvement in energy efficiency in government accommodation;
- Has helped awareness and understanding amongst landlords;
- Has provided a good opportunity to begin discussions around energy improvements and to factor it into negotiations between landlords and tenants.

Furthermore, the management framework of the green leases scheme is viewed by stakeholders as comprehensive and having the potential to support collaboration between the landlord and tenant.

INTERNATIONAL CASE STUDIES: RESIDENTIAL SECTOR

The aim of this section is to explore minimum energy performance and other regulatory approaches which have been taken in Europe and beyond to tackle the split incentive issue in the residential sector.

Minimum energy performance in rented units



England & Wales

Under the [Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015](#), landlords of privately rented domestic property in England or Wales must ensure that their

properties reach at least an EPC rating of E (or as close as possible) before granting a new tenancy to new or existing tenants. These requirements will then apply to all private rented properties – even where there has been no change in tenancy arrangements – from 1 April 2020 for domestic properties.

Supporting measures

To give time to landlords and investors to adjust, the measures were first announced (without details) in 2011 and are being gradually introduced between 2018 and 2020.

Furthermore, improvements are only 'relevant' for the purposes of the Regulations where a landlord has already spent £3,500 on a property and third-party funding (e.g. central government and local government funding, energy company obligation) is unavailable or insufficient to cover the remaining costs to reach an EPC rating of E.

A tax break scheme – the Landlords Energy Saving Allowance, was also in place till March 2017 to support residential landlords in this transition. The scheme gave the opportunity to landlords to deduct the cost of acquiring and installing certain energy saving measures against their income tax.

Landlords may also be able to claim exemptions from this prohibition:

- Where a landlord has made all the 'relevant energy efficiency improvements' that can be made (or there are none that can be made), and the property remains below EPC E. Validity: 5 years.
- Walls insulation exemption: A recommended energy efficiency measure is not considered to be a relevant measure where it is cavity wall insulation, external wall insulation or internal wall insulation (for external walls), and where the landlord has obtained written expert advice indicating that the measure is not appropriate for the property due to its potential negative impact on the fabric or structure of the building. The expert advice must be obtained from an architect registered on the Architect Accredited in Building Conservation register; a chartered engineer registered on the Institution of Civil Engineers' and the Institution of Structural Engineers' Conservation Accreditation Register for Engineers; a chartered building surveyor registered on the RICS's Building Conservation Accreditation register or a chartered architectural technologist registered on the Chartered Institute of Architectural Technologists' Directory of Accredited Conservationists. Validity: 5 years.
- Third party consent exemption: Depending on circumstances, certain energy efficiency improvements may legally require third party consent before they can be installed in a property. Where third party consent is required for a particular measure the landlord must identify this requirement and make and be able to demonstrate to enforcement authorities on request, 'reasonable effort' to seek consent. Validity: Generally, 5 years.
- 'Devaluation' Exemption: An exemption from meeting the minimum standard applies where the landlord has obtained a report from an independent surveyor who is on the RICS register of valuers advising that the installation of specific energy efficiency measures would reduce the market value of the property, or the building it forms part of, by more than 5%. Validity: 5 years.
- 'New Landlord' Exemption: The Regulations acknowledge that there are some, limited circumstances where a person may have become a landlord suddenly and as such it would be inappropriate or unreasonable for them to be required to comply with the Regulations immediately. Validity: 6 months.

All exemptions must be published in the [PRS Exemptions Register and can be checked by prospective tenants](#).

Enforcement and compliance

The legislation is being enforced by local authorities. Each local authority can decide which department is responsible for enforcing it. E.g. housing, health & safety, environmental.
Financial penalties: Up to £5,000 per property, and per breach of the Regs.

Impact to-date

The legislation came into force in April 2018 and its impact to date has been limited. The first version of the legislation (which included a “no cost” funding exemption for landlords) was unworkable due to the failure of the green deal and the structure of the Energy Company Obligation scheme. [Amendments to the bill have just been introduced](#) which replace the “no cost” funding exemption by a £3,500 cost cap – based on 3 different quotes, which should be enough to bring 60 to 80% of the rented property to an E. Any exemptions that have already been lodged under the ‘no cost to landlord’ requirements will expire in April 2020.

The enforcement rate is likely to be much higher now that the amendment bill has been passed: The regulations are easier to enforce because the requirements on landlords are a lot more straightforward. Although resources are limited within local authorities, a ring-fencing mechanism is in place whereby all fines collected by local authorities for non-compliance with this legislation can be kept by them.

Investors have also started to discriminate against poor-rated buildings within their portfolio strategies and seek to divest of stock that is either at risk or fails to meet the standards.

However, only 6% of private rented sector dwellings are currently rated below E. Furthermore, a recent report claims that up to 2.5 million EPCS are likely to be inaccurate and that an estimated 35,000 E-rated properties are being let illegally, due to be given a higher score than the building would otherwise receive^{xxxvii}.



Scotland

Following [consultation in summer 2017](#), the Scottish Government has announced that minimum energy efficiency standards will be introduced in privately rented properties in Scotland.

The standards will be phased in and will increase over time:

- From 1st April 2020: Any new tenancy will require the property to have an EPC of at least band E
- From 31st March 2022: All rented properties will need to have at least EPC band E
- From 1st April 2022: Any new tenancy will require the property to have an EPC of at least band D
- From 31st March 2025: All rented properties will need to have at least EPC band D.

The Scottish government is also exploring the opportunity of increasing the standard to C for all rented properties by 2030, where technically feasible and cost effective to do so.

The new regulations confirming the detail of how the standards will be applied should be brought forward this year.

Supporting measures

The standards will be phased in and will increase over a 5 years period.

The bill is likely to include a limited number of exemptions.

Home Energy Scotland will provide free, impartial advice tailored to each situation, as well as an estimation of costs. Financial supports will include interest-free loans and cashback grants. For further information on support for private landlords in Scotland, [please click here](#).

Enforcement and compliance

Local authorities will be responsible for issuing civic fines for non-compliance.

Impact to-date and potential challenges

As the legislation is about to be introduced, several challenges have been highlighted:

1. As the standards will be phased in and will increase over time, some changes in the EPC advisory report may be required. Some additional assessment may also be needed in some buildings – This should be appropriate and proportionate. A short life working group is currently working on this issue^{xxxviii}.
2. Policing may be an issue as local authorities do not traditionally check EPCs and lack resources to do so. People in the private rental market are often among the most vulnerable in society and unlikely to report a landlord that would not comply with the legislation.
3. Although landlords will be allowed to increase rents to cover the cost of energy efficiency upgrades, market conditions in some parts of the country mean this may not be possible.



The [City of Boulder](#), Colorado in the US has adopted “SmartRegs” (Ordinance No. 7726) that requires all licensed rental housing to meet a basic energy efficiency standard by the end of 2018. Approval depends on the results of required inspections that determine whether a property complies with energy efficiency standards.

In 98% of cases*, the inspection is completed by a trained and certified Rental Energy Efficiency Inspector. The results of the inspection determine whether improvements need to be completed. All improvements must be verified by the inspector who will then update the points. To meet the license requirements, each unit must achieve 100 energy efficiency points in addition to 2 water conservation points.

* The system is slightly different for multi-unit rental properties that have an apartment-complex design.

Supporting measures

The SmartRegs ordinances became effective in Jan. 2011, but the energy efficiency requirements for existing rental properties were only required to be met by Jan. 2, 2019. This

allowed for an eight-year implementation period, the first three years of which (2011-2013) were marked by significant federal, state and local funding available to ease implementation cost to property owners.

Boulder County offers a free energy efficiency consulting service called EnergySmart. This service is designed to help landlords navigate the improvement process, hiring contractors, and applying for rebates.

Exemptions exist for historic buildings, manufactured homes and buildings that can be verified as meeting/exceeding the energy efficiency requirements, including through the use of innovative materials, methods and/or equipment.

Enforcement and compliance

Civil Penalty for renting without a license range from \$150-\$500 for 1st violation to \$1,000 for 3rd violation.

Investigation fees from enforcement staff: \$250 per investigation. Continued non-compliance may result in a court summons, which carries a \$250 bond per violation.

Impact to-date

The most common upgrades completed to reach compliance to-date have been attic insulation, crawl space insulation and wall insulation.

Other regulatory initiatives



New-Zealand

As of July 2019, all rented properties in New Zealand (NZ) must have ceiling and underfloor insulation in all habitable spaces, where it can practically be installed. Where there is no existing insulation, or where existing insulation did not achieve minimum R-values when it was installed (R1.5-1.9 ceiling; R0.9 underfloor) or is no longer in reasonable condition, ceiling and underfloor insulation must be installed or upgraded (R2.9-3.3 ceiling; R1.3 underfloor) to NZ insulation installation standard NZS4246.

Additionally, all new tenancy agreements will have to include a statement from the landlord about the extent of insulation in the ceiling, underfloor and walls of their property.

Supporting measures

The new regulation has had a staged introduction (2016 for public and community housing and 2019 for all remaining tenancies) with a long lead time.

Public education and information campaigns were conducted, and guidelines were issued to inform landlords and tenants of their new obligations and rights.

Exemptions can be made in prescribed circumstances where it is impractical to make the changes.

Landlords of low-income and vulnerable tenants were eligible for subsidies - Subsidies for insulation in rental homes stopped at the end of June 2018. Some local councils offer financing options to homeowners and landlords. Landlords are responsible for the cost but can increase rent following an energy upgrade. However, any rent increase must comply with the Residential Tenancies Act, and a 60 days' notice must be given.

Enforcement and compliance

A landlord who fails to comply with the regulations will be committing an unlawful act and may be liable for a penalty of up to \$NZ 4,000 (approx. €2,500).

Impact to-date

The regulatory impact assessment conducted prior to the introduction of this new legislation found a high benefit to cost ratio from introducing a regulated insulation standard: \$2.10 for every \$1.00 of cost. It also found that a regulated minimum standard would have:

- Medium to high likely effectiveness in achieving the objective of making residential rental properties drier and easier to heat
- Low administration costs to landlords and tenants
- Medium operational impact for government.

New Healthy Homes Standards for rental homes will be phased in from July 2021. They will increase the minimum level for existing ceiling insulation, and add minimum requirements for heating, ventilation, draught stopping, moisture ingress and drainage. [Please click here for further information.](#)



Flanders – Belgium

Under the [Flemish Energy Renovation Programme 2020](#), all dwellings (including rental properties) must meet minimum roof and floor insulation.

These are assessed as part of the conformity process to ensure a property meets all minimum quality standards for safety, health and habitability. The conformity assessment process is based on a penalty point system: A property reaching a score of 15 or higher cannot be legally rented out. The penalty points for lack of sufficient roof insulation are being phased in over 5 years from 1st Jan 15 to 1st Jan 2020. As of this date, a R value for roof insulation < 0.75m² K/W will in itself give rise to a declaration of unsuitability.

Supporting measures

- A widespread communication campaign and information points in municipalities
- Phased implementation
- Financial support: Renovation grants, including a grant of €23 per m² as an additional incentive for dwellings occupied by vulnerable tenants, and tax benefits.

Enforcement and compliance

The certificate of conformity is not a rental permit, but an official document showing that the house meets the living standards. Although some municipalities require it via municipal regulation, it is generally not mandatory when renting out a property. However, the Flemish

government encourage landlords to have conformity certificates as a valid proof that they are bona fide landlord.

Every tenant can start an unsuitability procedure free of charge via the housing department of the municipality where they live. This is an administrative procedure whereby a local authority can declare a home unsuitable after an inspection, with a charge to the tenant if the home isn't declared "unsuitable".

Impact to-date

The pressure has increased on small private landlords but remains limited due to phase introduction, low minimum requirements and uneven enforcement between local authorities. Roof insulation can also be difficult to inspect on site and the number of inspection / site-visit is low – Approx. 14,000/ year.

However, the legislation does not include any exemptions (e.g. for listed buildings) and has contributed to energy efficiency awareness raising. It has laid the political and social foundation for the introduction of higher energy efficiency requirements.

CONCLUSION

Privately rented buildings are generally less energy efficient than the average building stock. Of the barriers to fully tapping the energy efficiency potential in this sector, the split incentives between tenants and landlords are one of the most acute and persistent. Policy responses to mitigate this issue include information tools (e.g. energy labelling), financial incentives, but also contractual and regulatory approaches.

Energy labelling has been mandatory for homes and commercial buildings offered for rental or for sale in Ireland since 2009. Several support schemes are also available to landlords willing to invest in the energy efficiency of their properties. Almost all research finds a positive effect of energy ratings on rental rates in the commercial and residential sectors in Ireland. However, in both sectors, the levels of mark-ups are generally not enough to fully recover investment costs and the effect of the energy rating is stronger where selling conditions are worse.

Green leases have become quite popular in the commercial sector in countries such as the UK and Australia. They have contributed to greater environmental awareness. However, actions taken as part of green leases are usually "light green" (e.g. changing the lighting to LED) as opposed to "dark green" (e.g. deep retrofit). Furthermore, in countries where green leases are not mandatory, these are usually only adopted by organisations that are likely to participate in other forms of voluntary environmental programmes, i.e. large organisations with sustainable goals.

Minimum energy efficiency requirements for rental properties on the other hand can send clear signals to the commercial and residential markets. They are particularly critical to improve current conditions in buildings at the low end of the market.

Although legislation in other countries is relatively new, evidence from the UK, the Netherlands, Belgium and the US, suggest that when this type of legislation is introduced, the number of investors, mortgage-banks, owners and occupiers asking for more detailed information about buildings' energy performance rises. Anecdotal evidences collected by the UKGBC suggest that investors already discriminate against poor-rated buildings within their portfolio strategies and seek

to divest of stock that is either at risk or fails to meet the standards. In the Netherlands, a growing number of financial institutions are adapting their real estate financing measures according to the new standard.

“Every successful energy saving programme needs three main components: carrots to provide incentives, sticks to ensure compliance and tambourines to increase awareness”. European Commission, Joint-Research Centre 2014.

However, for the legislation to have the desired impact on the rates and depth of energy renovation, a comprehensive approach to remove this barrier should be taken.

- The introduction of minimum standards for rental buildings should be signalled well in advance of its implementation deadline.
- The costs of introducing minimum standards should not outweigh the benefits accrued to tenants and costs to landlords of achieving the standard should not be so high as to lead to significant rent increases or unnecessary removal of properties from the market.
- It should be accompanied by a financing model and complementary measures (e.g. information campaign and advices) to achieve the desired effects and prevent the displacement of tenants.
- As effective implementation is key to its success, compliance and enforcement should be as simple as possible.

ACRONYMS & DEFINITIONS

Energy Performance Certificate (EPC) known in Ireland as Building Energy Rating (BER) certificates.

Green lease is a lease between a landlord and tenant of a commercial building which provides obligations on both parties to minimise adverse environmental impact in areas such as energy, water and waste.

Split incentive refers to transactions where the benefits do not accrue to the person who pays for the transaction. In the context of building-related energy, it refers to the situation where the building owner pays for energy retrofits efficiency upgrades but cannot recover savings from reduced energy use that accrue to the tenant.

Temporal split incentive refers to situations where the energy efficiency investment does not pay off before the agent transfers the property.

WICKED: Working with Infrastructure, Creation of Knowledge, and Energy strategy Development was a research project funded by the UK Engineering and Physical Sciences Research Council in 2014 - grant number EP/L024357/1.

Thanks to our colleagues in the following organisations for their advice and review:

Alembic Research Limited
Dutch Green Building Council
Energy Saving Trust
Green Building Council of Australia

HQE – France Green Building Council
Renovate Belgium
Renovate Europe
UK Green Building Council

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- ⁱ DCCAE, 2017. [Ireland Long Term Renovation Strategy 2017 – 2020](#).
- ⁱⁱ SEAI, 2017, “Up to a million Irish homes need a Deep Retrofit to boost energy efficiency”, http://www.seai.ie/News_Events/Press_Releases/2017/Up-to-a-million-Irish-homesneed-a-Deep-Retrofit-to-boost-energyefficiency-.html.
- ⁱⁱⁱ [S.I No. 666 of 2006 Energy Performance of Buildings](#)
- ^{iv} [S.I No. 243 of 2012 Energy Performance of Buildings](#)
- ^v Hyland M., Lyons R. C. and Lyons S. 2013. The value of domestic building energy efficiency — evidence from Ireland in *Energy Economics* 40 (2013) 943–952
- ^{vi} Idem.
- ^{vii} Collins M. and Curtis J. Return on energy efficiency investments in rental properties. *ESRI Research Bulletin*, June 2018
- ^{viii} Eichholtz, P., Kok, N., Quigley, J.M., 2010. Doing well by doing good? Green office buildings. *Am. Econ. Rev.* 100 (5), 2492–2509.
- ^{ix} Hyland M., Lyons R. C. and Lyons S. 2013. The value of domestic building energy efficiency — evidence from Ireland in *Energy Economics* 40 (2013) 943–952
- ^x Idem - [Economidou, M. 2014. Overcoming the split incentive barrier in the building sector . EUR 26727 EN – Joint Research Centre – Institute for Energy and Transport](#).
- ^{xi} DCENR, 2016. A strategy to combat energy poverty – 2016-2019
- ^{xii} DCENR, 2016. A strategy to combat energy poverty – 2016-2019
- ^{xiii} CSO, 2016. Census 2016 Profile 1 – Housing in Ireland. <http://www.cso.ie/en/csolatestnews/presspages/2017/census2016profile1-housinginireland/>
- ^{xiv} DCCAE, 2016 - [A Strategy to Combat Energy Poverty, 2016-19](#).
- ^{xv} DCCAE, 2017. [Ireland Long Term Renovation Strategy 2017 – 2020](#).
- ^{xvi} RTB, 2017. [Annual Report 2017](#).
- ^{xvii} Reddan, F. [Investors with €5bn to spend eye up Irish rental sector](#). *Irish Times*, Sep 17, 2018
- ^{xviii} Cooperative Housing, 2015. [Co-operative Housing Ireland publishes annual housing sentiment survey](#).
- ^{xix} RTB (2016). [The RTB rent index. Residential Tenancies Board](#).
- ^{xx} CSO (2016). Average earnings, hours worked, employment and labour costs by economic sector NACE Rev 2, type of employee quarter and statistic. Technical report, Central-Statistics Office.
- ^{xxi} CSO (2016). Rental tenants’ willingness-to-pay for improved energy efficiency and payback periods for landlords. *Energy Efficiency* (2018) 11:2033–205.
- ^{xxii} [Planning and Development \(Housing\) and Residential Tenancies Act 2016](#).
- ^{xxiii} SEAI, 2015. Extensive survey of the commercial buildings stock in the Republic of Ireland.
- ^{xxiv} [Economidou, M. 2014. Overcoming the split incentive barrier in the building sector . EUR 26727 EN – Joint Research Centre – Institute for Energy and Transport](#).
- ^{xxv} Clancy, J.M., Curtis, J., and O’Gallachóir B.P. 2007. What are the factors that discourage companies in the Irish commercial sector from investigating energy saving options? *Energy and Buildings - Volume 146*, 1 July 2017, Pages 243-256
- ^{xxvi} SCSi, 2018. [Annual Commercial Property Review](#).
- ^{xxvii} George Ogleby, 21 November 2017. [Could looming new energy efficiency standards spark a green rental market?](#)
- ^{xxviii} The Dutch GBC as part of their work to develop a Sustainable Renovation Delta Plan has developed the concept of [Paris Proof buildings](#). A Paris Proof office uses a maximum of 50 kWh per square meter of office space, similar calculations have been made for retail, education, hospitals and industrial buildings. They are currently exploring the idea of using these figures as minimum energy performance as opposed to the BER rating.
- ^{xxix} JLL IP, Inc and AKD N.V, 2018. The upcoming EPC regulation for buildings in the Netherlands.
- ^{xxx} Vandenberg, M. P. 2005. "The private life of public law". *Columbia Law Review* 105 (7); 2029-2096.

^{xxx}_i Janda, K.B, Bright, S., Patrick, J., Wilkinson, S. and Dixon, T.J. 2016. The evolution of green leases: towards inter-organisational environmental governance.

^{xxx}_{ii} Idem

^{xxx}_{iii} Idem

^{xxx}_{iv} Borck, J. C., & Coglianesi, C. (2009). Voluntary environmental programs: Assessing their effectiveness. *Annual Review of Environment and Resources*, 34(1), 305–324.

^{xxx}_v Newell, G. (2008). The strategic significance of environmental sustainability by Australian-listed property trusts. *Journal of Property Investment & Finance*, 26(6), 522–540. doi:10.1108/14635780810908370.

^{xxx}_{vi} Janda K.B et al, 2016.

^{xxx}_{vii} Matt Mace, 12 February 2019. [Landlords could be letting illegal properties due to 'inaccurate' EPC ratings, report finds.](#)

^{xxx}_{viii} For further information about the remit and membership of the working group, please see the Scottish Government's Energy Efficient Scotland: route map - p.40:

<https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2018/05/energy-efficient-scotland-route-map/documents/00534980-pdf/00534980-pdf/govscot%3Adocument>