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# Healthy Homes Barometer 2018

(Un)healthy homes, offices, and suburbanisation in Europe

VELUX®





Maroš Šefčovič  
Vice President of the European Commission

## **Implementation of the European Performance of Buildings Directive offers great opportunities to achieve a healthier, more sustainable Europe.**

The world is changing fast. People around the globe are moving from rural areas into cities at an ever-increasing pace. This trend challenges infrastructure, air quality, traffic and public services. It is no wonder, then, that the issue of urban sustainability is addressed at so many international fora, and has its own specific UN Sustainable Development Goal. In Europe we have been dealing with these questions for many years, given that our continent is already highly urbanised, with two thirds of Europeans living in cities and their suburbs.

That is why European cities have been pioneering the research and implementation of smart, sustainable, and efficient urban solutions. We in the European Commission have been working on leveraging this experience by building networks of excellence, while sharing knowledge and expertise between cities in Europe and around the world, through platforms like the European and Global Covenants of Mayors. We have also es-

tablished other platforms such as Urbis, which assist localities in finding the necessary finance for upscaling and smartening their cities. And we have changed the accounting rules to make it easier for public institutions in Europe to invest in energy efficiency.

Yet, while our cities are getting smarter, our building stock remains old. Three quarters of Europe's buildings are energy inefficient. Due to this, our buildings alone are responsible for 40% of Europe's energy consumption, and for over a third of its CO<sub>2</sub> emissions. Meanwhile, living in inadequate buildings also has an immediate impact on residents, their quality of life, and their opportunities.

We are changing this through extensive legislative work. For example, the European Performance of Buildings Directive (EPBD) recently went through significant revision, as part of our work on the Energy Union. Through this Directive, Member States are tasked with estab-

lishing a long-term strategy to support the renovation of their building stocks, with targets and recommendations on energy efficiency as well as indoor air quality, comfort and health.

Of course the solutions cannot and should not come from the public sector alone. I am therefore always glad to find initiatives by private companies who recognise that they can combine a positive societal impact with a strong business case. That is what the energy transition is all about!

For all these reasons, I welcome this year's edition of the Healthy Homes Barometer. It is essential that we base our decisions on well-founded, comparable and reliable data. That is the only way for us to face the housing challenge and deliver on our energy and climate commitments.

Let us always remember that the energy transition starts at home!



David Briggs  
CEO of The VELUX Group

## **Save our suburbs. Buildings in these often-overlooked areas are key.**

Welcome to the Healthy Homes Barometer 2018. This is the 4<sup>th</sup> edition of this study, which takes the pulse of European homes and buildings, and examines how they can be improved to the benefit of individuals, societies and the planet.

UN Sustainable Development Goal (SDG) 11 focuses on Sustainable Cities and Communities, and this new edition of the Healthy Homes Barometer demonstrates the importance of housing in achieving that Goal.

The vast majority of the world's population lives in cities and their suburbs, and Europe is no exception. Europe's buildings are, on average, old, inefficient, and not particularly healthy. This study examines different settings, building types and building deficiencies to establish how to best target renovation efforts and building legislation, in order to boost the renovation rate and reap the rewards of a healthy, efficient building stock.

In Europe over the last six decades, suburban growth has significantly outpaced urban growth. This year's study demonstrates just how important our suburban areas are to achieve a healthier building stock, and yet we are in danger of overlooking their importance. Action is needed to address health and climate concerns across populations – but in Europe's suburbs we may be missing a golden opportunity.

For the first time, the Healthy Homes Barometer 2018 also examines the places where many of us are when we're not at home – the offices and buildings where we spend our working days – and shows why investing in good working environments should be a given for businesses. Since we started publishing this report in 2015, our ambition with the Healthy Homes Barometer has been to work with accredited research partners in order to provide knowledge and data that can inform decision-making at all levels. This could be individual home-owners

considering a renovation project, or the national and European institutions shaping policy for the future.

We all need to step up to the housing challenge if we are to achieve the commitments made in the 2016 Paris climate accord. It is not enough for any one party to shoulder the burden. Policy-makers, industry and private individuals all have a part to play, and this report is a good example of the kind of knowledge-gathering that can contribute to our success.

We hope this year's edition will do the same. We thank our research partners Ecofys, a Navigant company, and Fraunhofer IBP, and we look forward to continuing dialogue with stakeholders at all levels.

# Urban and suburban living

## Opportunities and quality of life

**In Europe, suburban populations grew on average 54% more than urban populations between 1961 and 2011, with people looking to enjoy the relative space and comfort of single-family homes. Yet, when it comes to unhealthy buildings, these suburbs are in danger of being overlooked.**

### Urbanisation: a global phenomenon

Cities around the world continue to grow. In 2016, an estimated 55% of the world's population lived in urban settlements. By 2050, more than two-thirds of the world's population will be living in cities<sup>1</sup>.

Europe already exceeds these projections. 73% of EU inhabitants already lived in cities, towns and suburbs in 2014, with that number expected to rise to 80% by 2050<sup>2</sup>.

People move to cities for many different reasons, but it is primarily for better economic opportunities, educational options and cultural activities. However, city living inevitably involves some com-

promises, especially when it comes to living space, cost, pollution and noise.

### Suburbanisation: a European dream

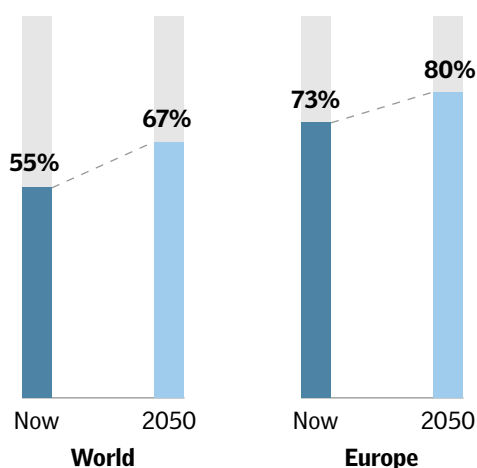
In Europe, many urban residents still aspire to the ideal of having a house and a garden – the advantages of city life with a sense of space, clean air and nature. From 1961 to 2011, Europe's suburban population increased by 54% more than its urban population, while its rural population actually declined. There are variations in this trend, with a few countries, especially in Central and Eastern Europe (CEE), still seeing higher levels of urban growth.

The trend towards suburbanisation is principally due to people's demand for

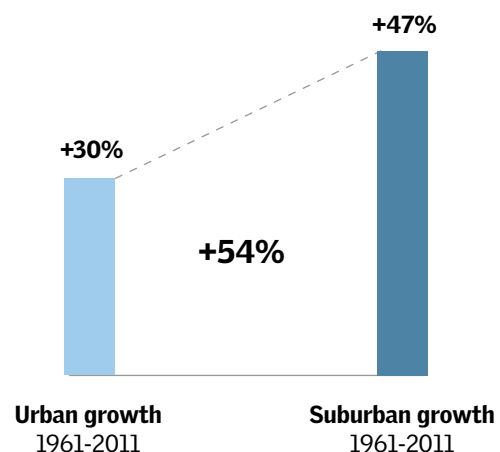
a certain quality of life, combined with the economics of housing and other lifestyle factors:

- **Space:** 33% more people report shortage of space in urban vs suburban areas, and lack of space is a major cause of dissatisfaction with a person's dwelling.
- **Cost:** the cost of housing per square metre is on average 42% higher in urban than in suburban areas.
- **Pollution:** 48% more people report having problems related to outdoor pollution in urban areas as compared with suburban areas.
- **Noise:** 39% more people report having problems related to noise in urban areas as compared with suburban areas.

### Increasing urban population



### Relative population growth EU (1961-2011)



<sup>1</sup> United Nations Habitat: <https://unhabitat.org>

<sup>2</sup> The State of Housing in the EU 2017: <http://www.housingeurope.eu/resource-1000/the-state-of-housing-in-the-eu-2017>

### Urban vs. suburban living



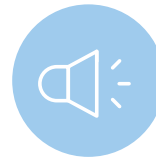
**+33%**  
report shortage of space



**+42%**  
higher cost per m<sup>2</sup>



**+48%**  
report pollution-related  
problems



**+39%**  
report noise-related  
problems

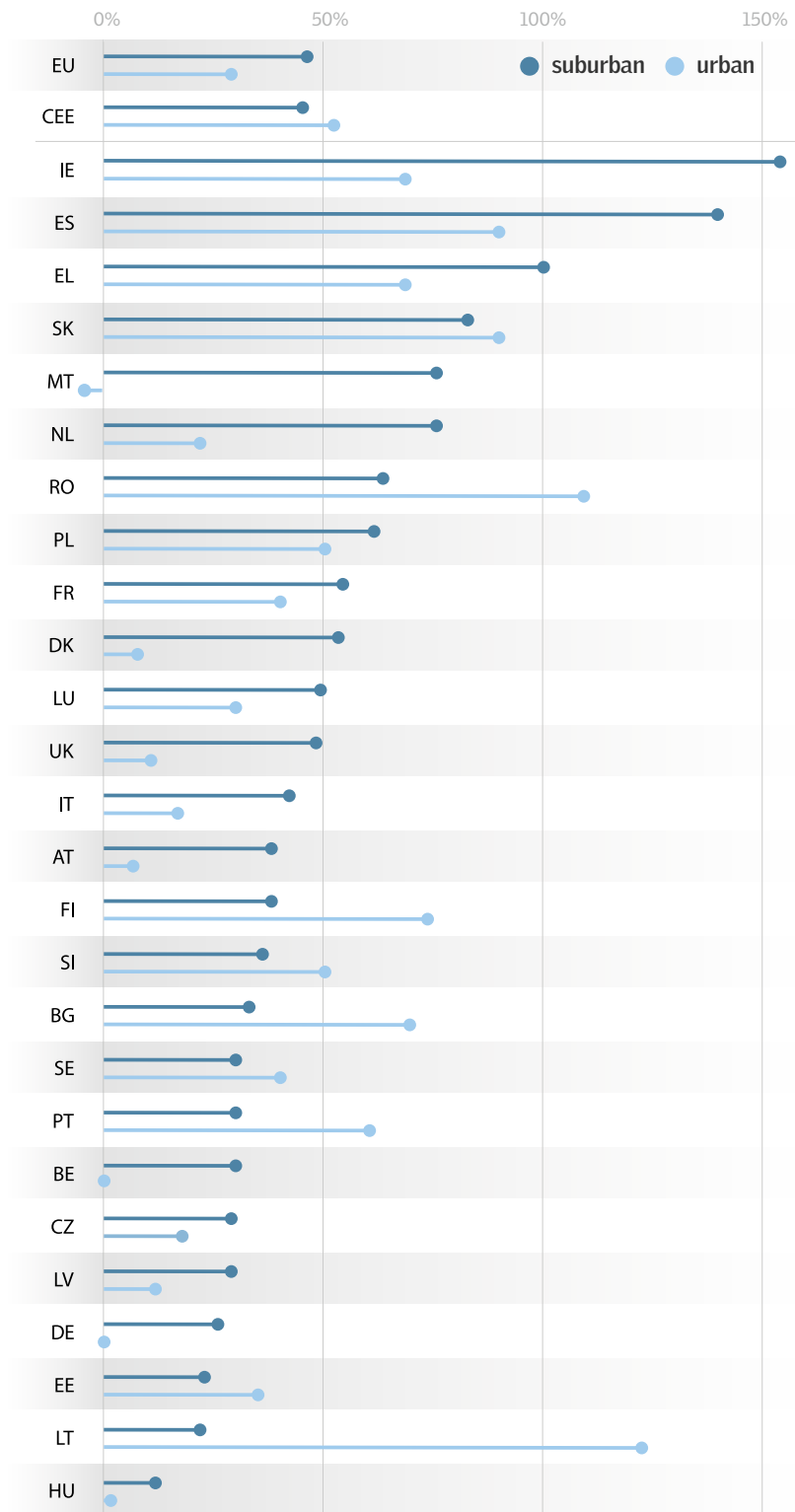
There are, of course, trade-offs to be made. For example, access to public transport is considerably easier in urban areas than in suburban areas. But they seem to be trade-offs people are willing to make.

### The makeup of European cities: single vs. multi-family homes

Also interesting to note is the distribution of single-family homes (SFHs) and multi-family homes (MFHs). In 2012, urban areas were made up of 63% MFHs and 37% SFHs. In suburban areas the opposite was true, with only 38% MFHs, but 62% SFHs.

Urbanisation is a hot topic. But as growth in suburban areas outpaces urban growth in most European countries, it is vital that we focus on the needs and opportunities presented by these growing communities.

### Urban and suburban population growth (1961-2011)



- EU European Union
- CEE Central and Eastern Europe
- AT Austria
- BE Belgium
- BG Bulgaria
- CY Cyprus
- CZ Czech Republic
- DE Germany
- DK Denmark
- EE Estonia
- EL Greece
- ES Spain
- FI Finland
- FR France
- HR Croatia
- HU Hungary
- IE Ireland
- IT Italy
- LT Lithuania
- LU Luxembourg
- LV Latvia
- MT Malta
- NL Netherlands
- PL Poland
- PT Portugal
- RO Romania
- SE Sweden
- SI Slovenia
- SK Slovakia
- UK United Kingdom

# Taking action

## Keys to healthier homes

**2/3 of Europe's residential building stock is more than 40 years old**

**Europe is struggling with an aging housing stock. The need for renovation offers an opportunity to achieve major improvements in health, comfort and efficiency. Single-family homes are key.**

Around 75% of Europe's population currently lives in cities, towns and suburbs. In the 2017 edition of the Healthy Homes Barometer we saw that buildings are responsible for close to 40% of energy use, and that the condition of the home you live in has a direct impact on how healthy we feel. Therefore, the state of housing in our cities and suburbs is vital if we are to achieve healthy, sustainable societies.

and only 10% of buildings currently have A or B class energy performance certificates. At the same time, the current renovation rate of existing buildings is low, with only about 1-2% of the building stock renovated each year<sup>2</sup>.

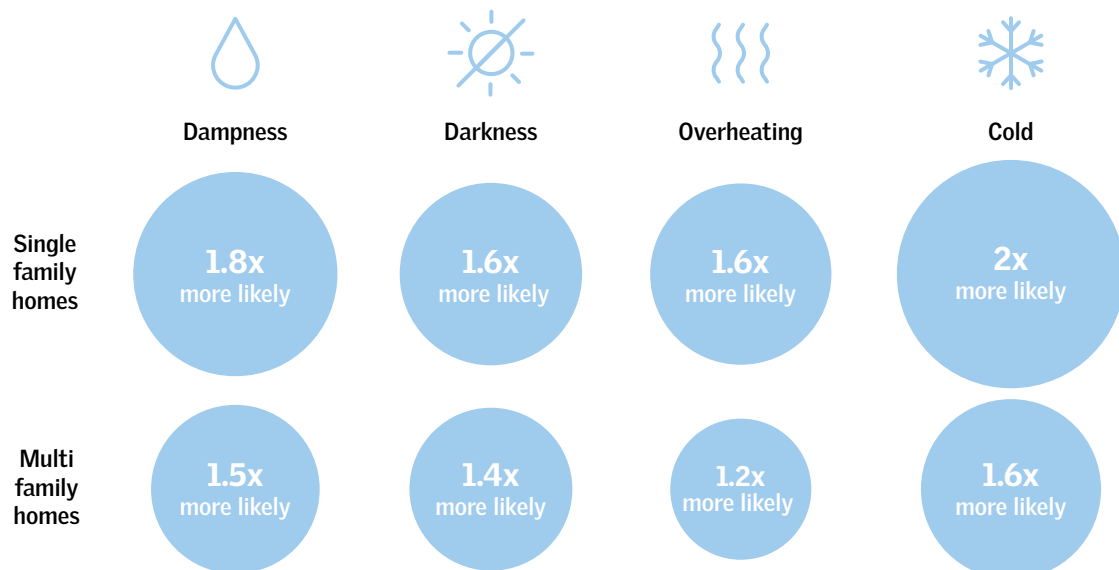
### Cold homes are the most damaging

New data presented in this report demonstrates how a range of building deficiencies affects homes – and health – in Europe. The most damaging deficiency from a health perspective is having a home that is too cold in winter, which, if you live in a single-family home, means you are twice as likely to report poor health.

### Old buildings; poor performance

Buildings in European cities are old. In most EU countries, about two thirds of the residential stock was built before the first European thermal building regulations came into effect (i.e. before 1979)<sup>1</sup>,

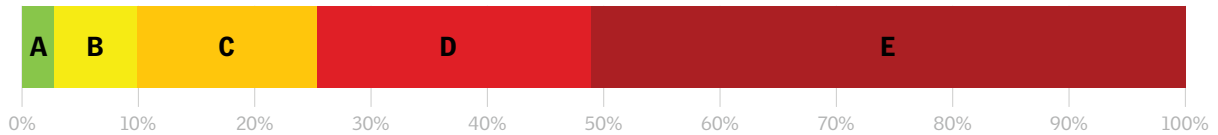
### Building deficiencies and the likeliness to report poor health



<sup>1</sup> EU Buildings Database: <https://ec.europa.eu/energy/en/eu-buildings-database>

<sup>2</sup> Committee on Industry, Research and Energy (ITRE), European Parliament: [http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL\\_STU%282016%29587326\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL_STU%282016%29587326_EN.pdf)

### Distribution of the building stock per Energy Performance Certificate class



#### Single-family homes are key to addressing health

It is interesting to note that in all cases, single-family homes (SFHs) with deficiencies are more likely to have a negative impact on health than multi-family homes (MFHs).

SFHs tend to have more exterior elements per dwelling (roof, windows, walls), where specific deficiencies are often to be found.

At the same time, SFHs are more likely to be owned (as opposed to rented) than MFHs, and this affects decision-making when it comes to renovation.

#### "It's the housing, stupid"

This year's research demonstrates that when it comes to deficient housing, it's the homes themselves that cause illness, and not your economic situation.

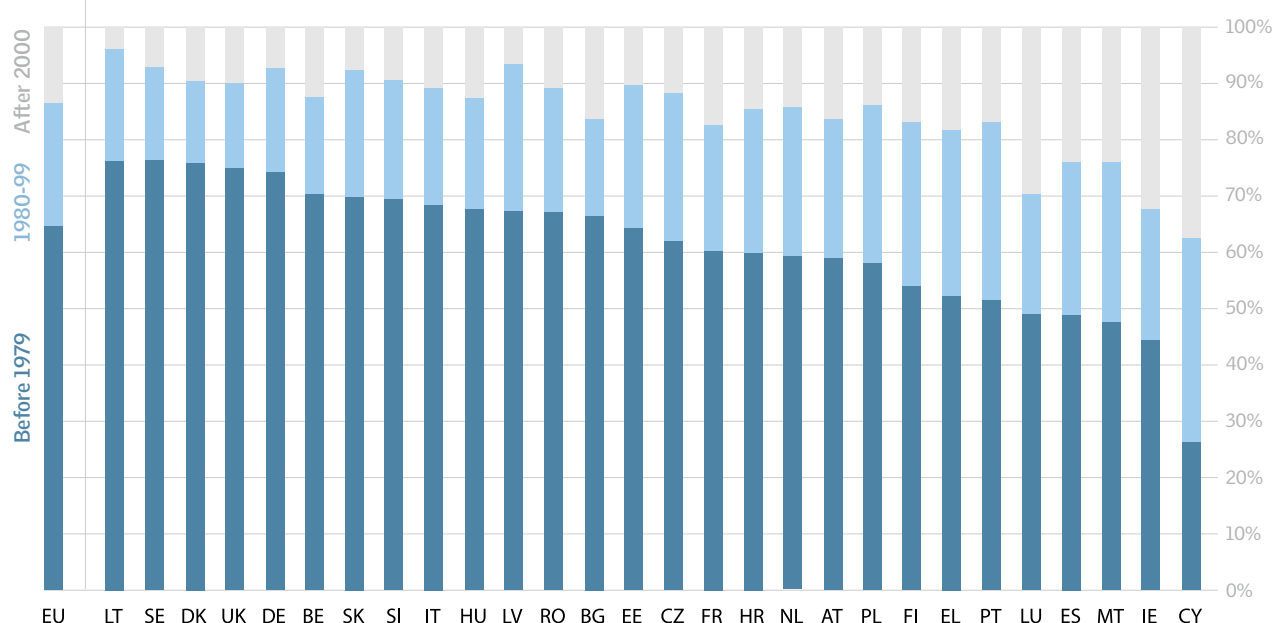
Housing deficiencies have the same negative impact on residents' health regardless of available income. If you are in the top 25% in terms of available income and have a leaking roof, for example, you are just as likely to report poor health as if you are in the bottom 25%.

#### Old buildings + health impacts = need for renovation

We now know how old our building stock is; we know how damaging different building deficiencies can be to health; and we know that single-family homes are key to making an impact.

This knowledge must be made available so that home and building owners can make informed decisions about renovation, and so that they can capitalise on the economic, environmental and health benefits available. And this knowledge should also help to inform effective policies that incentivise renovation to the benefit of individuals and society.

### Construction date of dwellings



# The renovation challenge

## Overcoming barriers

**Renovations can be challenging at the best of times. In order to increase the renovation rate we must address the most common barriers faced by homeowners, while shaping effective policies.**

We saw in the Healthy Homes Barometer 2017 that there is private capital available across Europe to the tune of €30 trillion, and that 71% of European households could potentially afford a staged renovation at €75,000 (Copenhagen Economics, 2017).

However, even when capital is available, barriers exist that prevent many homeowners from taking the plunge.

### Ownership, tenancy and the housing burden

On average, rates of home ownership across Europe are high, although considerably lower in many wealthier western European countries.

Regardless of whether we rent or own property, housing has become the principle expenditure for Europeans. The financial burden of housing is on the rise, and hits the poor disproportionately hard. Overall, housing is now the single highest expenditure item for Europeans. It has increased from 22% of Europeans' monthly budget in 2000, to 25% in 2015<sup>1</sup>.

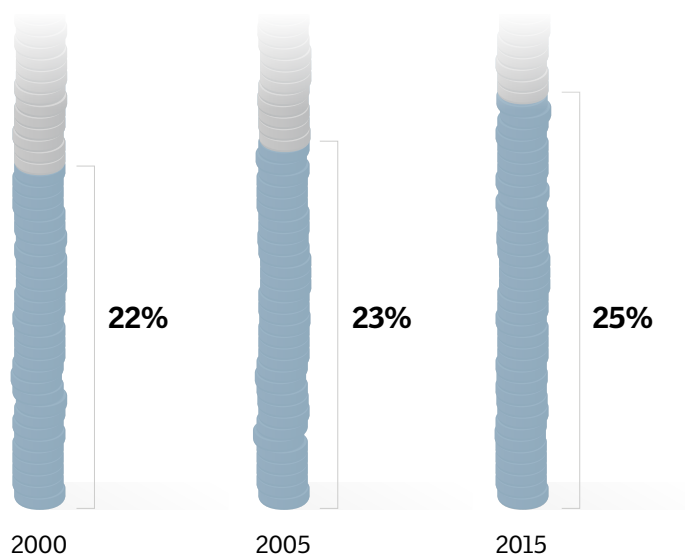
### Barriers to renovation

Renovating a building is a major undertaking, and there are many barriers that can make it even more complicated. If we are to increase the renovation rate, and thereby improve the healthiness, comfort and efficiency of our building stock, then we need to work to address these barriers.

According to the European Commission<sup>2</sup>, well-documented barriers include:

- **Information:** lack of available and understandable information regarding the efficiency and comfort benefits resulting from renovation.
- **Split incentives:** especially in rented accommodation, tenants are unlikely to renovate because their incentive is time-limited; landlords are unlikely to renovate because they do not see themselves as immediate beneficiaries of the investment.
- **Lack of awareness of "business case":** inability or unwillingness to see renovation as a positive, long-term investment and to calculate costs/benefits (such as increased home resale value) accordingly.
- **High transaction costs for small projects:** in smaller renovations, the costs involved in initiating the project and finding suitable contractors can be disproportionately large.
- **Capital markets:** especially in light of the 2008 financial crisis, lenders are less active in facilitating this type of investment, and there is a lack of available information about financing.

% of Europeans' monthly budget spent on housing

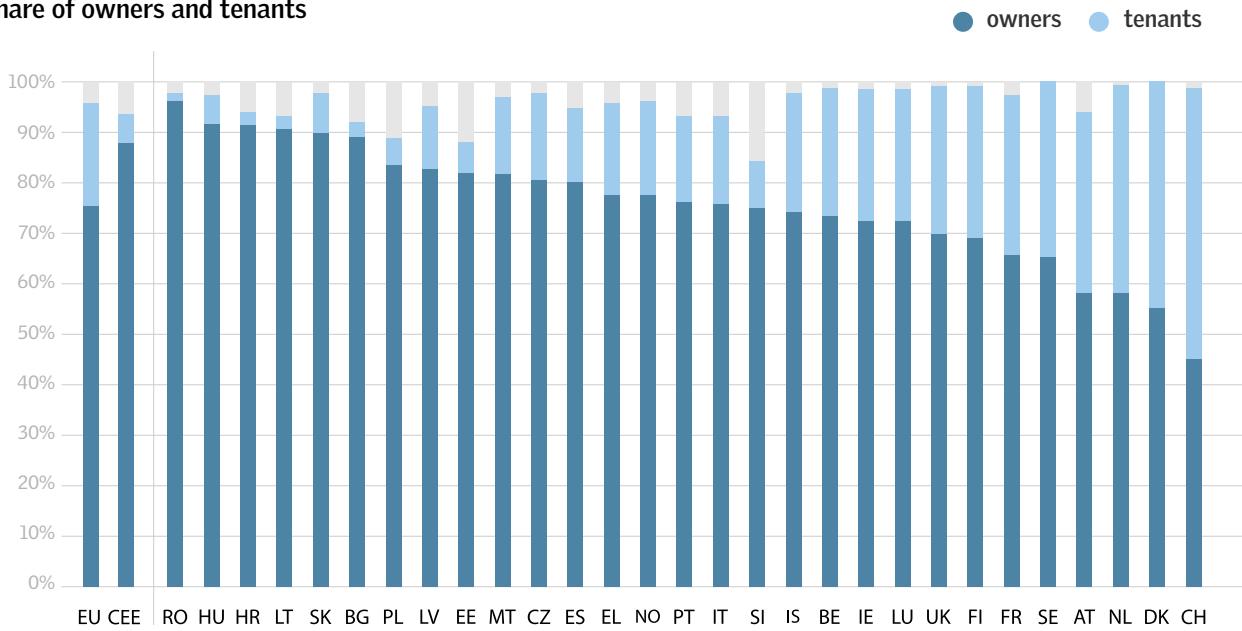


<sup>1</sup> The State of Housing in the EU 2017: <http://www.housingeurope.eu/resource-1000/the-state-of-housing-in-the-eu-2017>

<sup>2</sup> Impact Assessment for the Energy Efficiency Directive 2016: [https://ec.europa.eu/energy/sites/ener/files/documents/1\\_en\\_impact\\_assessment\\_part1\\_v4\\_0.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/1_en_impact_assessment_part1_v4_0.pdf)



### Share of owners and tenants



#### Solutions: incentives

There are two main types of incentive for addressing renovation barriers.

Incentives by reward (e.g. subsidies) can be effective, but must achieve additionality, i.e. they must bring about renovation projects which otherwise would not have happened.

Incentives by requirement (e.g. legislation) can also catalyse renovation activity. For example, the recent review of the EPBD (European Performance of Buildings Directive) includes requirements on indoor climate which, if correctly implemented by member states, should promote more renovation and healthier, more efficient buildings across Europe.

#### Solutions: industry

It is not only up to politicians and legislators to encourage renovation.

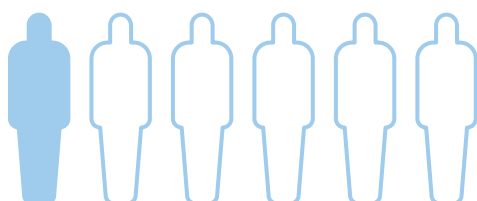
The building industry (manufacturers and housebuilders) has a responsibility

too. Technologies for cost-effective renovation exist, but in order for the market to take the necessary upturn, we need both scalability and simplification of solutions. We will look at some such solutions in the next chapter.

#### Solutions: information

We have seen in previous editions of the Healthy Homes Barometer, that one in six – or 84 million Europeans – currently lives in an unhealthy building, and that 73% percent of European homeowners quote improved wellbeing as a driver for renovation.

Only by making information readily available about the true state of buildings and their impact on residents, and about the best ways for individuals and property owners to address poor housing, will we unlock the private investment necessary to boost renovation rates significantly.



**1 out of 6** Europeans reports living in an unhealthy building

# Social and affordable housing

## Renovating for life

**People with lower available income are more likely to be tenants than homeowners, or to live in social or municipal accommodation. Strategies that catalyse renovation in this sector are a win-win, with huge potential benefits for societies and individuals.**

Cities and suburbs can be polarised social environments, with rich and poor living in close proximity to one another. So what can we do to promote and boost renovation in the social, municipal and rental housing markets?

Levels of social housing vary hugely across different European countries, according to their different demographics and welfare systems (see map).

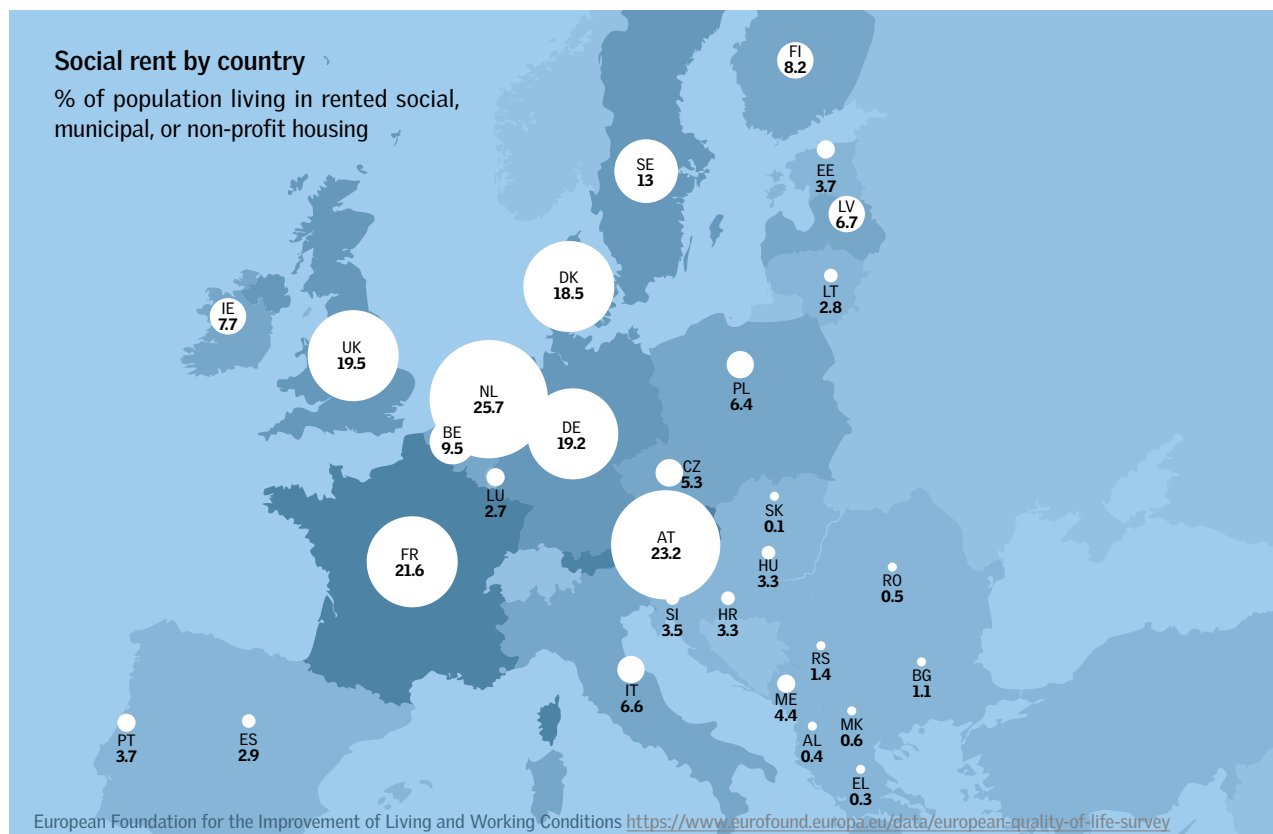
We have already seen in this report that poor housing affects health, regardless of a person's level of available income.

Nevertheless, having lower available income does mean you are more likely to have building deficiencies in the first place.

People in the lower 25% in terms of available income are almost twice as likely to have deficiencies such as a leaking roof or a home that is too cold in winter. And being less well-off also means residents are more likely to be tenants rather than owners. In fact, those in the lower 25% are twice as likely to rent their home as those in the top 25%.

### Social housing: a sound investment

Investing in good quality social and affordable housing can significantly improve the overall health of society. According to a recent report covering the whole European Union<sup>1</sup>, inadequate housing costs EU economies nearly €194 billion per year – in direct costs associated with healthcare and related medical and social services – and indirect costs such as lost productivity and reduced opportunities. The report estimates that



<sup>1</sup> <https://www.eurofound.europa.eu/fr/news/news-articles/inadequate-housing-is-costing-europe-eu194-billion-per-year>

bringing the standard of housing up to an acceptable level across Europe would cost about €295 billion. This implies that the investment could be repaid within 18 months, through savings in healthcare and better social outcomes, such as increased productivity and sustainability.

### RenovActive: a case study in budget-focused renovation

Whether it is governments and municipalities tackling welfare and emissions targets, or private housing associations trying to improve their portfolio of accommodation, the good news is that a renovation that will improve energy efficiency, comfort and health does not need to be prohibitively expensive.

To demonstrate this, in 2016 the VELUX Group completed a project called "RenovActive". It transformed a derelict, uninhabitable social housing property in a suburb of Brussels, Belgium, into a bright, healthy, and energy-efficient property.

The project had to be completed within the tight budget set by the local social housing company for renovating this type of building. In order to ensure future scalability, different standardised renovation elements were developed, including:

- Bright daylight conditions and natural airflows through the home using a central staircase and roof windows.
- Improved building envelope and insulation.
- Increased living space by attic conversion and building extension.

### Improved performance and health

Since the RenovActive project was completed, its performance has been monitored. These are a few key findings:

- Improved health: residents state that they have better sleep quality, fewer sick days, and less need for medication.
- Indoor air quality, with controlled natural ventilation, is high – CO<sub>2</sub> levels in all the main rooms remain below 1,150 ppm.
- No overheating in summer: indoor temperatures are usually below 26°C in all main rooms.

### A blueprint for social housing renovations

Based on the success of this project, the social housing company which owns the house has decided to renovate a further 86 homes in its portfolio according to the RenovActive concept. The first six houses are currently under renovation and due for completion in 2018.

**€295 billion**  
one time cost



cost of renovating building stock

**€194 billion**  
per year



cost of inadequate housing

### The RenovActive house





# Healthy workplaces A win for companies

**Comfortable and healthy office spaces improve employee satisfaction and productivity. Given the high proportion of business costs spent on employees, such investments should be a no-brainer.**

After our homes, we spend the next largest part of our lives at work. In the same way that populations have moved from rural environments into cities, so workplaces have also moved indoors, and especially into office environments.

Currently, an average of 36% of the European workforce (or 81.4 million people) work in an office environment, rising to more than 40% in some countries.

### Healthy employees: a sound investment

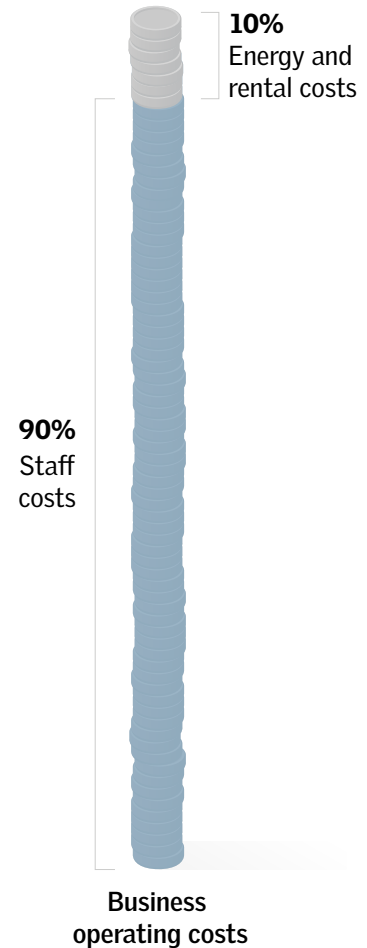
Personnel costs, including salaries and benefits, typically account for about 90% of a business' operating costs<sup>1</sup>. This means that relatively small variations in workers' productivity can have a large overall impact on a company's performance and costs. Giving employees office environments conducive to

good health and high productivity should be an obvious investment to make. Office design has been shown to impact the health, wellbeing and productivity of its occupants, through considerations such as indoor air quality, thermal comfort, lighting and noise.

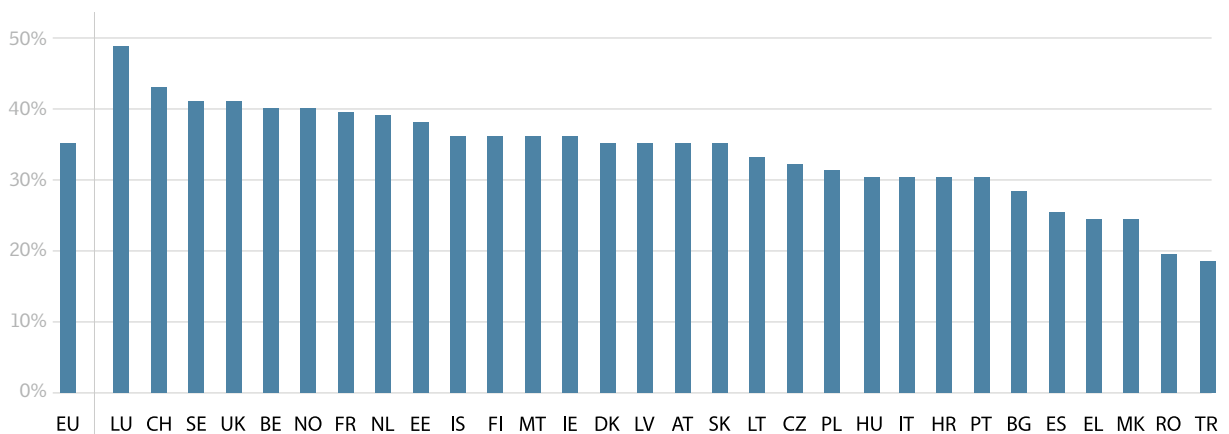
In a recent global study<sup>2</sup>, one in three people said that the design of an office would affect their decision to work for a company. It also showed that natural light is the most sought-after element within the workplace, despite an astonishing 47% of workers saying that they have no natural light at all in their work environment.

### Comfortable temperatures and plenty of fresh air

More than 80% of European workers in office-based sectors state that they



### % of office workers in total workforce



<sup>1</sup> Health, Wellbeing & Productivity in Offices, The next chapter for green building September 2014, World Green Building Council

<sup>2</sup> HUMAN SPACES: The Global Impact of Biophilic Design in the Workplace, 2015: [www.humanspaces.com](http://www.humanspaces.com)

<sup>3</sup> European Working Conditions Survey: <https://www.eurofound.europa.eu/data/european-working-conditions-survey>



**47%**  
of office workers have no natural light in their working environment



**46 minutes**  
more sleep per night on average for office workers with windows

are exposed to excessively high or low temperatures close to a quarter of the time<sup>3</sup>. Office temperatures above 23°C and below 20°C can decrease employee performance by up to 10%<sup>2</sup>.

Studies show the positive effects of ventilation on building-related symptoms (such as fatigue, and irritation of the eyes, nose, or throat), comfort and productivity. Although ventilation rates in mechanically ventilated buildings are generally higher in cold seasons, buildings with mechanical ventilation systems or air conditioning can also have a higher prevalence of building-related symptoms when compared to naturally ventilated buildings.

The ideal is often hybrid ventilation, which combines air conditioning with windows that open (either automatically or manually).

**Daylight boosts productivity...**

Several studies show that the majority of people believe daylight is good for

their general health, visual capabilities and productivity<sup>4</sup>. This finding is echoed by a 2018 YouGov study, in which 63% of respondents said they think daylight has a significant effect on productivity.

Another study<sup>5</sup> examined workers in a call centre and in other office environments. Better access to views, along with improved daylight conditions, were found to significantly improve performance, with workers in the call centre processing calls 6% to 12% faster when they had the best possible view versus those with no view. Other office workers, meanwhile, were found to perform 10% to 25% better on tests of mental function and memory when they had the best possible view.

**... and helps ensure a good night's sleep after work**

Another recent study<sup>6</sup> by neuroscientists suggests that office workers with windows received 173% more daylight exposure during work hours, and slept an average of 46 minutes more per night.

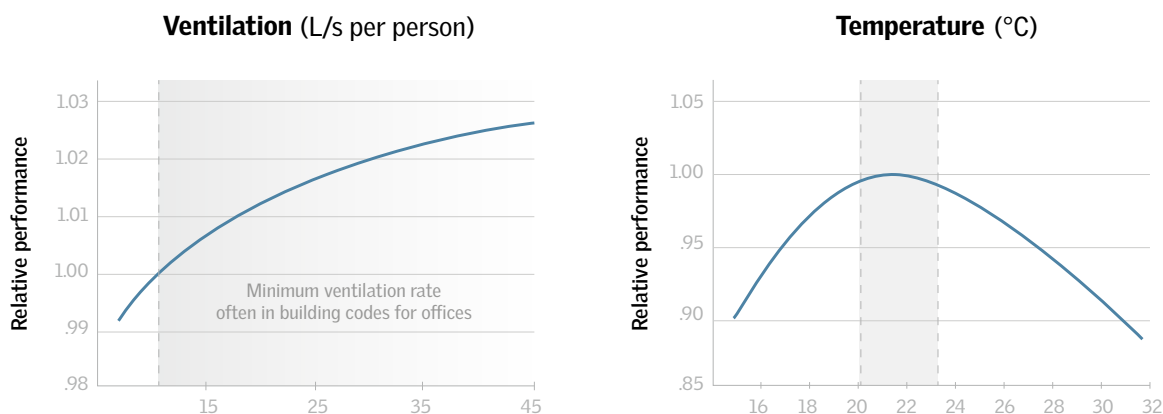
**Noise is a productivity-killer**

Noise distractions can have a considerable impact on productivity. In fact, noise is one of the leading causes of office dissatisfaction. A 2012 study<sup>7</sup> calculated that, in a well-managed office, average productivity loss through noise distractions in a typical eight-hour workday was around 70 minutes, while about 28% of European workers in office-based sectors state that they are exposed to loud noise<sup>3</sup>.

**Reaping the benefits**

Office employees spend 30% or more of their waking hours each year in offices. It makes sense, then, that businesses and governments look closely at what constitutes a productive, healthy indoor working environment in order to reap the productivity and wellbeing benefits that, over time, are likely to repay the additional investment many times over.

**Office conditions and productivity**



<sup>4</sup>Galasiu, AD, Veitch, JA. Occupant preferences and satisfaction with the luminous environment and control systems in daylit offices: a literature review. Energy Build 2006; 38: 728-742.  
<sup>5</sup>Heschong Mahone Group (2003) Windows and Offices: A Study of Office Worker Performance and the Indoor Environment: [http://h-m-g.com/downloads/Daylighting/A-9\\_Windows\\_Offices\\_2.6.10.pdf](http://h-m-g.com/downloads/Daylighting/A-9_Windows_Offices_2.6.10.pdf)  
<sup>6</sup>Chuang I. (2013) Impact of workplace daylight exposure on sleep, physical activity, and quality of life. American Academy of Sleep Medicine 36  
<sup>7</sup>Harvard Business Review, 17 May 2012

## Healthy buildings in a (sub)urbanised world

As we move into a more urbanised existence, the world's population is becoming more densely concentrated in and around cities. This study shows us that suburban areas should not be forgotten in this new paradigm. On the contrary, suburban living is becoming the new normal for more and more people in Europe.

A suburban, single-family home is the dream for many people, offering the benefits of proximity to urban centres with more of the space and peace associated with the countryside. Yet these single-family homes are frequently old, unhealthy and inefficient, and do not provide the kind of quality housing people require and desire.

By addressing the unhealthy homes in which people often live, along with the unhealthy buildings in which they often work, we have an opportunity, not only to improve the health and quality of life of individuals, but also to improve societies and address inequalities, while saving money and valuable resources at the same time.

### About the Healthy Homes Barometer 2018

This report was compiled using new analysis of the EU SILC and EUROSTAT databases, carried out by the energy and climate consultancy Ecofys, new research from Fraunhofer IBP regarding workplace environments, along with a range of other published academic sources. Where sources are not individually referenced, data is taken from the aforementioned analysis by Ecofys (New insights on the relation between quality of dwelling, socio-economic status and health in EU28 and its Member States, Ecofys 2018).

Ecofys' research is based on analysis of Eurostat microdata from the EU-wide survey "Income and Living Conditions in Europe" (EU-SILC). The EU SILC survey assesses the status and development of income and living conditions in Europe and covers the domains income, poverty, social exclusion, housing, education, labour and health. The research presented here is based on anonymised self-reported observations. Data in EU-SILC are collected either on household or individual level.

Eurostat provides these data for approved research proposals handed in by accredited research institutions like Ecofys.

For this research, anonymised results for each EU-SILC variable for more than 100,000 individual households and more than 250,000 adults (16+) across all EU Member States – except Germany – were made available by Eurostat. For each Member State, individual information about at least 3,000 households and 6,000 persons have been analysed for the years in focus. A focal point of the research is data from 2012, where more detailed information on housing conditions was collected in the survey.

Note on available income. When examining different socio-economic groups in the study, we refer to "available income". This variable is derived by subtracting a given respondent's estimation of the lowest monthly income the household would need to "make ends meet" from his/her total disposable income, leaving the amount per month available for non-essential expenditure.







"In Europe over the last six decades, suburban growth has significantly out-paced urban growth. This year's study demonstrates just how important our suburban areas are to achieve a healthier building stock, and yet we are in danger of overlooking their importance. Action is needed to address health and climate concerns across populations – but in Europe's suburbs we may be missing a golden opportunity."

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CEO of The VELUX Group



#HealthyBuildings