



# Healthy Homes Barometer 2020

Ensuring a green recovery post-Covid-19  
with sustainable buildings

**VELUX®**

# GREEN RECOVERY

## - A unique opportunity to build back better

The Covid-19 pandemic has caused a vast health crisis, and in its wake, an economic crisis has hit Europe and the rest of the world. A new understanding of the opportunities in making a green recovery is emerging with Governments looking for input and policy measures that can stimulate economies and help meet climate targets.

In this green recovery, building renovation can play a key role. Few sectors are better at creating local jobs fast, and now is the chance to combine speedy economic recovery with improved housing standards and quality of life for millions of people. On average, 6.5 million fulltime employees in the European construction sector are involved in renovation, with the potential of an additional 2-4 million due to

a tripling of energy renovation efforts (not counting the spill-over effects generated in other sectors)<sup>1</sup>. And on top of this, building renovation is an indispensable and highly cost-efficient measure to reach EU and national climate targets.

Europeans spend **90%** of the time inside buildings

### Why focus on healthy buildings?

Since people spend 90% of the time inside buildings, the indoor environment is more important than ever to the health and well-being of people. The confinement caused by Covid-19 has highlighted the vital role of homes not only as a safe and comfortable

living space, but increasingly as a place that also has to accommodate playing, learning and working at home. It is time to rethink the direction of policies over the long term to make sure that energy renovation and healthy buildings go hand in hand.

### Let's not forget the suburbs

During the last 60 years, suburban growth has significantly outpaced urban growth according to the HHB 2018, and today more than two thirds of Europeans live in cities and suburbs. In other words, suburban living is becoming the new normal for more and more people.

These suburbs are in danger of being overlooked when it comes to building renovation. Single-family homes are frequently old, unhealthy and ineffi-

**2/3**

of the time spent indoors is spent in homes

cient, and people report living in dark, damp and cold homes leading to an increased risk of respiratory and other diseases. At the same time, private home owners face the renovation challenge with often limited funds.

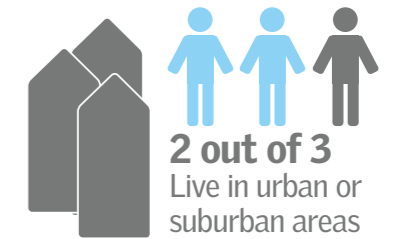
### Need to increase renovation rate

In Europe, 75% of the 2050 building stock will be made up of today's buildings. Nevertheless, the current renovation rate of existing buildings is very low. On average, less than 1% of the national building stock is renovated each year. The current rates of renovations should at least double in order to meet the ambitious goal of carbon-neutrality by 2050, set out in the European Green Deal<sup>2</sup>.

Therefore, there is a need to boost incentives that will encourage private

investment. If just 2% of European homes were appropriately renovated every year, the number of homes with dampness could be halved by 2050. Likewise, the number of Europeans with respiratory illnesses caused by living in damp homes could be reduced by 25% by 2050<sup>3</sup>.

The recent revision of the European Performance of Buildings Directive (EPBD) sets forth targets and recommendations on energy efficiency as well as indoor air quality, comfort and health that can be used to guide building renovation as well as new builds.



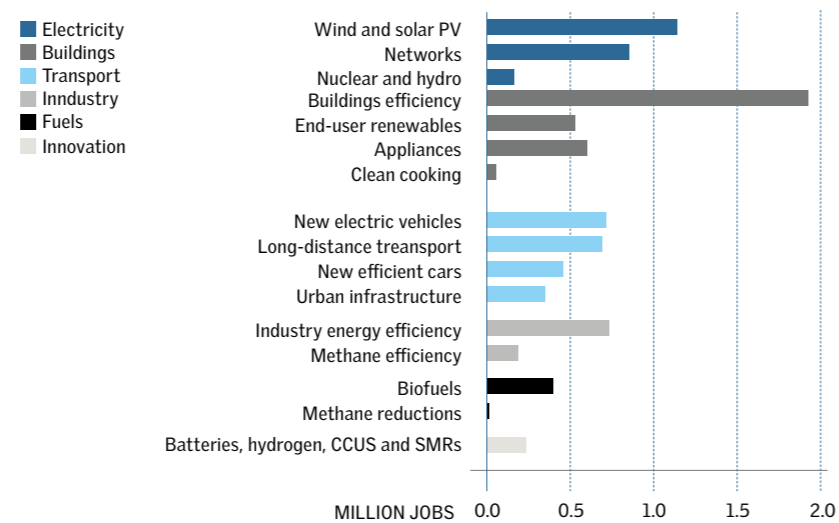
**75%** of the 2050 building stock will be made up of today's buildings<sup>4</sup>

Less than **1%** of buildings in the EU are renovated each year

On 29 January 2020, the European Commission's new work programme was published. Under the first priority - 'a European Green Deal', the Commission announced its intention to launch an ambitious 'Renovation Wave' initiative in the buildings sector.

### IEA Report on Sustainable Recovery (2020)

Annual average constructing and manufacturing jobs created globally in the sustainable recovery plan. Nearly 9 million new jobs would be created on average each year by the sustainable recovery plan: around 35% of these jobs would be in the buildings sector.



The Healthy Homes Barometer 2020 is dedicated to exploring the role of homes, schools and office buildings in the Green Recovery. Our planned research in new topics for the 2020 Barometer this spring was halted by Covid-19 like many other activities. Instead we decided to compile relevant facts and insights from the last three years, which we hope may serve as inspiration for a renewed focus on healthy and climate-friendly buildings in the light of efficient means for fast and green recovery.

Best regards,  
David Briggs, CEO of the VELUX Group

1. Navigant for the European Commission (2019): "Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU."

2. European Commission, 2019. "The European Green Deal"

3. Fraunhofer IBP (2016)



# Living in an unhealthy home

According to the Healthy Homes Barometer 2017 (HHB 2017), one out of six EU citizens reports living in a home that is damp, dark, too cold or too warm. Living in an unhealthy home has negative health effects for all family members, but children are especially at risk.

The HHB 2019 revealed that one out of three European children under the age of 15 lives in an unhealthy home that may cause respiratory diseases, allergies or skin diseases that may follow the child into adulthood.

The Barometer also found that children living in suburban single-family homes were especially at risk due to factors like leaky roofs, mould and inadequate thermal comfort.

## Healthy homes and energy savings go hand in hand

In most EU countries, about two thirds of the residential housing stock was built before the first European thermal building regulations came into effect (i.e. before 1979)<sup>4</sup>. This means that only about 10% of the current building stock is rated A or B in energy performance rating schemes<sup>5</sup>.

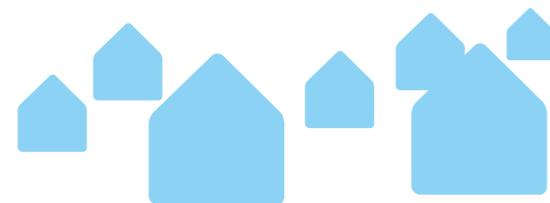
At the same time, 40<sup>6</sup> million Europeans face the 'eat or heat' dilemma every time they wake up to a cold day. The consequences of energy poverty can be poor health; in fact, twice as many people living in cold homes report poor health according to the 2017 HHB.

## Indoor comfort and energy savings trigger renovation among private home owners

There are 110 million detached and semi-detached single-family homes in Europe. 75% of these homes are owned by private homeowners and many are in need of renovation.

Three main factors drive home renovation in privately owned homes. First, to save money on the energy bill. Second, to improve the health and comfort of the family; according to the HHB 2016, almost three out of four Europeans would renovate their home if it increased the comfort of the family. And finally, home renovation adds value to the property. This is supported by a recent study from the European Commission showing that the most relevant aspects of energy renovation for consumers are not the energy savings themselves, but the cost savings and making their home more comfortable and healthier<sup>7</sup>.

According to the European Commission<sup>8</sup>, there are, however, some well-documented barriers to embark on home renovation, notably lack of knowledge of health, comfort and economic benefits, difficulties in finding right solutions, suppliers and contractors and lack of credit facilities for renovation projects. These barriers have to be dealt with to effectively increase the renovation rate.



**1 OUT OF 3**  
  
**EUROPEAN CHILDREN LIVE IN UNHEALTHY HOMES**

**110 million** is the number of single-family homes in Europe

**75%** of Europeans are motivated to renovate their homes if it improves their well-being

**60%** of Europeans live in single-family homes

**40%** Europeans are more likely to have asthma when they live in a damp or mouldy home



**Dampness:**  
11.5 million children report living with leaky roofs, damp walls or rot/mould in window frames or floors.



**Darkness:**  
Around 4.2 million report living in houses without enough daylight.



**Cold temperatures:**  
Almost 6 million report living in homes that cannot stay adequately warm.



**Excess noise:**  
Over 13 million report excessive noise pollution from neighbours or traffic.

Note that these building deficiencies are not mutually exclusive. Dwellings with several deficiencies are therefore counted more than once.

## Rented and social housing needs special attention

On average, one in four Europeans live in rented, social, municipal or non-profit housing.

Renovation for improved living conditions and energy efficiency is a major undertaking, and there are barriers that make it even more complicated. Especially in rented accommodation, tenants are unlikely to renovate because their incentive is time-limited and the investment does not pay back, whereas housing associations may hold back due to financial constraints.

If the renovation rate is to be increased in order to improve the health, comfort and energy efficiency of the rented building stock, these barriers have to be addressed. Affordability, ease of duplication and long-term value creation are key elements in stimulating renovation projects.

### Affordable renovation

The RenovActive project performed on a social housing estate in Belgium is one case demonstrating how renovation concepts can be affordable, scalable and easy to reproduce.

In this case, the RenovActive principles were used to transform a derelict social housing property into a bright, healthy, and energy-efficient home within a tight budget set up by the local social housing company.

So far, the renovation principles have been duplicated on 86 homes proving the financial viability of the concept.

### Pays off in terms of improved health

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>9</sup>, inadequate housing costs EU economies nearly €194 billion per year in terms of healthcare, social costs and lost productivity.

The report estimates that 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 just 18 months.



**RenovActive**



**€295 billion**  
one time cost  
Cost of renovating building stock



**€194 billion**  
per year  
Cost of inadequate housing

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

5. BPIE (2017): "97% OF BUILDINGS IN THE EU NEED TO BE UPGRADED"

6. Housing Europe (2019): "The State of Housing in the EU 2019 - Decoding the new housing reality"

7. Navigant for the European Commission (2019): "Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU."

8. 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)

9. Eurofound (2016): "Inadequate housing is costing Europe €194 billion per year."

The HEAD project showed that light and air quality are important factors in boosting children's performance at school.



## Healthy schools enhance children's learning capabilities

**In normal times, more than 65 million European children and young students spend between 170 and 190 days annually at school.**

Poor indoor climate in schools and day-care centres caused by lack of daylight, dampness, indoor pollutants, or poor ventilation can be linked to serious health conditions.

Unhealthy homes and schools seriously impact education. European children under the age of 15 miss over 250,000 school days due to respiratory conditions, about 365,000 days due to asthma, and almost 1,100,000 days because of issues related to eczema.


### Good lighting and fresh air link to better performance

A review of multiple studies found that improved air quality could boost student performance by up to 15% with a positive effect on working speed, attention level, and concentration<sup>11</sup>. In addition, improved indoor air quality can lead to reduced student absence<sup>12</sup>. The recent HEAD project<sup>13</sup> in the UK

showed clear evidence that well-designed primary schools can substantially boost children's academic performance in reading, writing and maths. The study concluded that differences in the physical classrooms explained 16% of the variation in learning progress over a year for the 3,766 students included in the study.

### Sick children affect the family

When a child is sick, it affects the entire family. Parents must stay home to care for the child, leading to productivity losses at work. One study has shown that more than 40% of parents of children suffering from eczema reported

 Children in the UK are missing 2 million school days every year.




missing work to care for their children, losing on average about three days a month<sup>14</sup>.

**70%** of time in school is spent in classroom<sup>15</sup>

Increased air quality can boost performance by up to 15%



### Economic benefits by 2060 - EU

	Increasing ventilation in schools	<b>€ 252.8 Billion</b>
	Reducing exposure to mould and damp in homes	<b>€ 55.7 Billion</b>
	Total economic benefit of improving indoor environments in schools and homes	<b>€308.5 Billion</b>

10. European Commission, 2018. "The Organisation of School Time in Europe. Primary and General Secondary Education - 2018/19"  
 11. Fraunhofer-Institut für Bauphysik IBP, 2015, "Impact of the indoor environment on learning in schools in Europe."  
 12. Fisk et al., 2015. "Parent-reported outcomes of a shared decision-making portal in asthma: a practice-based RCT"  
 13. Clever Classrooms - Summary Report of the HEAD Project link  
 14. Filanovsky et al., 2016 "The Financial and Emotional Impact of Atopic Dermatitis on Children and Their Families."  
 15. SINPHONIE (2014) "Schools Indoor Pollution and Health Observatory Network in Europe."

## Healthy offices improve productivity

**After the home, people spend most time at work. Workplaces increasingly move indoors, and especially into office environments; according to the HHB 2018, an average of 36% of the European workforce today work in offices.**

With 90% of the average operating costs of a company going into staff costs, it pays off for businesses to create healthy and productive indoor working environments<sup>16</sup>.

### Fresh air and natural light improve productivity

Studies have shown that good indoor air quality at work can increase people's productivity by up to 10%<sup>17</sup>. It is also interesting that in one global study, one in three people make the

office design part of the decision to work for a company with natural light being the most sought after parameter. Despite the evident importance of natural light, 47% of workers said that they had no natural light in their work environment<sup>18</sup>.

In one study, 63% of respondents agreed that daylight significantly affects productivity<sup>19</sup>. Another study examined workers in a call centre and found that workers with access to daylight and view to the outside processed calls 6-12% faster compared to colleagues with no views<sup>20</sup>.

### Thermal comfort makes a difference

Thermal comfort is also a key challenge in European office environments. 80% of Europeans working in an office state

that they are exposed to excessively high or low temperatures close to a quarter of the time<sup>21</sup>, while studies show that office temperatures above 23°C and below 20°C can decrease employee performance by up to 10%<sup>22</sup>.

### Access to daylight enables a good night's sleep

While windows are highly valued by office workers, access to daylight during the day also affects the sleep quality at night. A recent study by neuroscientists<sup>23</sup> suggests that office workers with windows received 173% more daylight exposure during work hours, and slept an average of 46 minutes more per night.



**30%** of waking hours are spent in the office

**80%** of office workers work in offices that are too hot or too cold

16. Health, Wellbeing & Productivity in Offices, The next chapter for green building September 2014, World Green Building Council  
 17. Bjarne Olesen, Technical University of Denmark: "Productivity and Indoor Air Quality."  
 18. HUMAN SPACES (2015): "The Global Impact of Biophilic Design in the Workplace."  
 19. YouGov (2018): "THE EFFECTS OF MODERN INDOOR LIVING ON HEALTH, WELLBEING AND PRODUCTIVITY"  
 20. Heschong Mahone Group (2003) Windows and Offices: A Study of Office Worker Performance and the Indoor Environment  
 21. European Working Conditions Survey: <https://www.eurofound.europa.eu/data/european-working-conditions-survey>  
 22. HUMAN SPACES: op.cit.  
 23. THE EFFECTS OF MODERN INDOOR LIVING ON HEALTH, WELLBEING AND PRODUCTIVITY"

**About the Healthy Homes Barometer 2020**

The Healthy Homes Barometer is a series of pan-European reports designed to investigate the link between homes and health.

The first edition of the Healthy Homes Barometer was published in 2015, and the 2020 edition is the sixth barometer published by the VELUX Group.

This year's barometer is a fresh compilation of facts, research and insights from the HHBs from 2017, 2018 and 2019 framed by the recent Covid-19 pandemic and the notion of a Green Recovery published by the EU Commission.

The 2017-19 barometers are based on research conducted by RAND Europe, Ecofys (a Navigant company), Fraunhofer IBP and other leading European research institutions.

Find all Healthy Homes Barometers **here**

