Human beings spend on average 90% of their lives indoors. Buildings are also a huge drain on energy resources and create a significant amount of greenhouse gas emissions. This Special Report looks deeper into the places we live and work.

At the annual Healthy Buildings Day on 10 October in Paris, organised by Danish window manufacturer Velux, industry experts and lawmakers discussed the challenges posed by our homes, schools and offices.
Healthy homes: ‘The biggest health and business opportunity of a lifetime’

French MP: ‘We try to bring method to the madness of building renovation’

1 in 3 children live in unhealthy homes, warns ‘alarming’ report

Velux CEO: ‘If you want the most energy efficient home, live in a cave’

Our buildings are making our children sick
Indoor environment quality and healthy homes play an ever more substantial role in human well-being, according to new research unveiled at a high-level event last week (10 October).

Last Thursday, Danish firm Velux released the fifth edition of its ‘Healthy Homes Barometer’, an in-depth look at the state of housing and other buildings, plus the effect they have on human health.

Statistics show that Europeans spend on average 90% of their lives indoors, be it at home or work, which has prompted the company to invest resources in finding out how that affects our health.

The previous edition of the barometer concluded that one in six Europeans report living in an unhealthy home and, for the first time, the research delved into the state of the continent’s workplaces.

Damp, inadequate lighting and poor insulation all pose a risk of health complaints like asthma, pneumonia and poor sleep cycle, which the report said has a knock-on effect on productivity at work.

2019’s barometer focused on how those factors impact on children specifically. In a set of startling results, the report concluded that one in three European children live in what can be described as an unhealthy home.

The barometer drew on EU datasets provided by SILC and Eurostat and assessed living conditions based on four primary indicators: dampness, darkness, cold and excess noise.

Finland performed the best of the 28 EU countries, though it still recorded a rate of one in five children in an unhealthy home, while Portugal was

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labelled the worst, with one in two.

“The primary function of a building is to keep occupants comfortable and safe. When you improve the indoor environment you significantly improve performance and productivity,” Velux CEO David Briggs told reporters at the Barometer launch event.

Indeed, an unhealthy home has a quantifiable impact on children's performance at school, according to the report.

In terms of school days missed due to damp-related illness, Portugal reported figures more than 60% higher than the EU average. By contrast, that number was more than 60% lower in high-flying Finland.

The United Kingdom was the worst performer in that regard though, with more than 490,000 school days missed among children aged 5-15, which is more than 80% higher than the EU average.

Ingrid Reumert, a Velux VP who presented the report, acknowledged that other factors specific to countries, such as weather and temperature, play their part but insisted that the data clearly shows a pattern.

The barometer also makes bold predictions on financial input and benefits, insisting that increasing ventilation in schools and reducing exposure to damp in homes could yield gains of more than €300 billion by 2060.

Better conditions in schools would mean higher productivity and a trickle-down impact on the labour market.

Harvard academic Joseph Allen, a specialist in building health who works as an advisor to Fortune 500 companies, said “the ability to think strategically is strikingly improved by changing air quality indoors”.

THE 90%

Allen welcomed the results of the barometer and said it should push stakeholders to focus more on indoor environment.

“Why do we ignore the 90% of our lives that we spend indoors? I’ve spent 40 years of my life inside!” he told reporters, pointing out that indoor air quality is not policed nearly as stringently as outdoor air quality.

He also explained that last century’s global energy crisis was the catalyst for a trend of making buildings more efficient, which, however, largely forgot about the people who live and work inside them.

Allen said that the efficiency drive “choked off” buildings and relegated ventilation to an afterthought but warned that it is “a false dichotomy” to say that efficiency and healthy environment cannot go hand-in-hand.

On the health impacts, the Harvard professor said “the role of buildings in our understanding of human health is a glaring omission”, adding that “home health is heart health, given that we spend two-thirds of our lives at home”.

Allen added that “the people who design, build and maintain our buildings are more important to our health than doctors” as a result, insisting “that is not an exaggeration”.

The business case is quickly gathering momentum too. Data from Eurofund, an EU agency, concluded in 2016 that inadequate housing costs the bloc €194 billion every year in direct and indirect costs like healthcare and loss of productivity.

Studies estimate that if a massive investment in bringing all housing up to an acceptable level were done in one hit across the EU, the cost would be paid back completely within 18 months.

“We’re quite literally sitting on a quantifiable impact on children's performance at school, according to the report. But the message is yet to fully sink in with national governments and regional authorities. EU legislation on buildings, finalised last year as the Energy Performance of Buildings Directive, hopes to change that.

The building sector has been called a ‘sleeping giant’, given that it soaks up 40% of the EU’s energy and emits more than 30% of total emissions, mostly due to outdated and inefficient building stock.

Renovation rates currently barely exceed 1% but the EPBD’s insistence on long-term national strategies, promotion of well-being and higher standards for new buildings should all have an impact once the rules fully come into force in 2020.

France is considered a leader on the issue and French politician Marjolaine Meynier-Millefert a key player in adapting the country’s buildings to new challenges.

A member of Emmanuel Macron’s LREM party and co-chair of the national renovation committee, Meynier-Millefert told EURACTIV that it is a “vastly underestimated situation”.

 Asked about why France is leading the way, she replied that new rules mean at least a one-sixth of the surface of new buildings must be windows in order to increase natural light and ventilation. However, she did acknowledge that it faces legal challenges due to the cost involved.

France is indeed making renovations a priority and has pledged to invest €14 billion over five years, as well as other measures like providing free renovation roadmaps and clarifying policies.

She also said that the government is dedicating €4.8 billion to the public sector and wants to amend applicable legislation and construction codes in order to make them about more than energy efficiency.

“We have to give more leeway to professionals. For example, currently, regulations on water-savings stifle innovation. The emphasis should be on the end outcome, not how you get there,” Meynier-Millefert insisted.
The Yellow Vest movement has actually boosted France’s ambition to be a building renovation champion as it positioned the economy front and centre in the debate, the government’s ‘co-pilot’ for the project told EURACTIV.

Marjolaine Meynier-Millefert, member of French Parliament with La République En Marche! She represents the French National Assembly to the Higher Council for Building and Energy Efficiency.

She spoke to EURACTIV’s Sam Morgan.

Do you spend a lot of time in Brussels?

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I try to go as much as possible and I’m trying to go more and more, as I’m absolutely convinced that every European country has already experimented and tried things that will save us time in what we’re doing. We’re all trying to reinvent things that have already been done elsewhere. If something works, we can find out why, but also if something doesn’t work, that is knowledge that can be shared.

*France is a very diverse country in terms of geography, climate, economic situation and so on. Does that make it an ideal testing ground and a leader for renovations in that case?*

It’s true that we have all sorts of problems ourselves. Renovating in the mountains is very different to urban and seaside renovations. All sorts of factors you would not have expected and plenty to experiment on. Actually, maybe we are experimenting too much because so many schemes are being tested and it is so difficult to share information. Setting up a comprehensive database that can be used and reproduced is proving to be complex.

*Communication seems to be a problem. Do platforms and instruments like the European Energy Poverty Observatory provide a potential model?*

I don’t think we need yet another new instrument, maybe we’ve got enough being created every year. I rather think it is a matter of how we think out our projects and integrating this issue into the things that simply have to be done. Launching an experiment, reflecting on the results of the experiment and then coming up with conclusions on it, is a process that is not in the culture of innovation yet.

*Do people have to realise then that it’s more a matter of getting things right than being the first to do it?*

No actually, we don’t have to get it right. In innovation, there is not a 100% safe place where you’re sure you’re going to get it right the first time. Mostly, you don’t and it’s a matter of ‘try, try, try again’. My favourite saying is: “success is going from failure to failure without loss of enthusiasm”. The secret to success, in this case, is making sure the reasons we don’t get something right are understood and shared. In France, we’ve got this culture of succeeding though, so it’s difficult for us to admit failure. It’s ok in this case at least.

*You’ve suggested making renovation roadmaps free to those who need them. How developed is that idea?*

It’s something we voted on in the last energy and climate law in the summer. We tried to bring method to the madness of renovation and the planning is looking all the way up to 2028. We implemented a series of measures that are going to be increasingly demanding up to that point.

The first thing is making the tools we use to measure more efficient. Take the building label as an example, with its A-G rating. So far, it has not been reliable and that will be done by 2021. From that point on, the worst-performing buildings will have to be removed. By 2028, there will be consequences if you haven’t done something about it.

We will determine and explain soon what those consequences will be, because we want to be able to discuss it with citizens, as part of the ongoing social debate we’re having in France. That way, we can aim to get public acceptance for this measure.

*There are climate protests on a regular basis across the world, yet the impact of buildings in terms of energy consumption and emissions remains under the radar. Why is that?*

It’s true, lots of people don’t really know so we have to push that knowledge further. But more and more do know, I would say.

Things are changing and fast. The Yellow Vests really helped us out there because it was such a crisis that it forced everyone to stop and look. Everyone then realised and agreed that the most efficient way to fight fuel poverty and do something for the environment is housing renovation. But we need more ambassadors.

*Is there anything else that can increase awareness more quickly?*

Well, at first we were telling people that you need to renovate your homes because it is good for the climate. Maybe 20% of people involved went for that, the others simply weren’t interested.

But then we switched over to ‘renovate your homes and you will save money’, because of increasing energy prices and so on. There is also the comfort aspect, which doesn’t just mean a nice couch or whatever, it’s about being healthy in the home you live in, at the right temperature.
A third of European children live in damp, cold, dark or noisy homes, according to new findings released last week. Portugal is the worst offender in the EU, with one in two kids exposed to unhealthy conditions.

The state of our buildings and, in particular, their impact on human health is in the spotlight more and more, as new EU rules on renovations come into effect. A series of deep-dives into the issue of well-being have also raised awareness.

Danish window company Velux has supported five so-called Healthy Homes Barometers and 2019’s edition focused on how poorly designed or maintained buildings affect child health.

By using official data provided by Eurostat and SILC, research institute RAND concluded that 26 million European children live in conditions that put “them at higher risk of experiencing health problems”, such as asthma, bronchitis and pneumonia.

The EU average is one in three, with Portugal performing the worst with a rate of one in two. Finland recorded the most positive result, with one in five children at risk.

Liberal MEP Morten Petersen said in a foreword to the report that “buildings are intended to be safe and healthy places for our children to grow up in. Therefore, it is alarming to read that 1 out of 3 European children live in unhealthy homes.”

The Danish lawmaker explained that the newly finalised European

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Performance of Buildings Directive (EPBD) is the solution to the problem, as it obligates EU members to come up with long-term strategies designed to retrofit out of date buildings.

“The EPBD – if properly implemented – offers a great, cost-efficient opportunity to achieve major improvements in health, comfort and efficiency,” Petersen concluded.

**TACKLING THE PROBLEM**

RAND took into account four factors when compiling the data: dampness, darkness, cold temperatures and excess noise. For the purposes of the report, the institute said that children exposed to just one factor are considered at risk of living in an unhealthy home.

The Health & Environment Alliance (HEAL) told EURACTIV that “we welcome this report that underlines the need to make children’s health a political priority, which is currently not the case”, adding that the next Commission and Parliament should make it a priority.

“In the next months, EU policy-makers will have many opportunities to boost children’s health,” HEAL added, citing the European Green Deal, pending climate target reviews and a zero pollution strategy.

The EPBD includes health policy within its provisions, which HEAL called a “a good start” but the group warned that “member state authorities still do not adequately consider health, and health experts are not involved in renovation efforts”.

At the launch event for the barometer on 10 October, Harvard academic Joseph Allen, an expert in healthy buildings, warned that there is a lack of regulation of indoor air quality, despite human beings spending on average 90% of their lives inside.

Allen told journalists at the Paris event that “the role of buildings in our understanding of human health is a glaring omission”, adding that “home health is heart health, given that we spend two-thirds of our lives at home”.

HEAL agreed that indoor standards are important but overlooked, explaining that “often there are more sources of pollution than outside; one such source are chemicals which can be released by products in indoor use”.

The group added that products like furniture cleaner need to be thoroughly assessed and certified safe before they are put on the market.

In terms of outdoor air quality, an area where the EU has clear rules in place, the situation is bleak regardless.

A new report by the European Environment Agency (EEA) concluded on 16 October that most Europeans are exposed to pollution deemed unsafe by the World Health Organisation (WHO).

“Air pollution harms us all, but is particularly damaging for the most vulnerable: children, pregnant women and the elderly,” warned the European Environmental Bureau (EEB).

The EEA report confirmed that 400,000 premature deaths occur every year as a result of the crisis.
Companies and lawmakers must take more responsibility in helping to solve issues related to buildings, including reducing carbon emissions and improving health standards, according to Velux CEO David Briggs.

David Briggs is the CEO of Danish windows firm Velux. He spoke to EURACTIV’s Sam Morgan on the sidelines of the 2019 Healthy Buildings Day in Paris.

Can initiatives like the Healthy Homes Barometer transfer the ‘Greta effect’ to the buildings sector and convince people to make changes to reduce their inefficiencies and improve health standards?

I’m a little bit cautious about saying the “Greta Thunberg effect” because we don’t need to be overly dramatic, at least in this issue, although I have a deep respect for that young lady. But I think most policymakers are now clear that if we’re going to meet our emission targets then we’ve got to address energy efficiency in buildings. It’s pretty commonly understood that 40% of our carbon emissions are from them, so we know we’ve got to accelerate renovation rates and legislate to ensure new builds are as efficient as possible.

With Healthy Buildings Day, we want to make sure that this need to renovate does not mean that we forget the basic premise of a building: to protect inhabitants, keep them comfy and healthy. Ninety percent of our time is spent indoors. If indoor conditions aren’t right then people are going to get sick. Let’s take the opportunity of needing to renovate buildings to ensure well-being too.

So there’s no dichotomy between efficiency and health?

No, it’s not a choice. It’s absolutely an ‘and’. If you start to make it a choice, by starting to legislate and design in that direction, you may as well take it to the extreme: if you want the most energy-efficient home, live in a cave. I don’t know about you but I don’t want to live in a cave. Nobody wants to buy or live in a house just because it’s energy efficient. People, of course, want that but, fundamentally, they want a house or working environment that is comfortable to be in.

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This is the fifth Healthy Homes Barometer to come out. Are you still shocked by the numbers they throw up? One in three European children living in an unhealthy home, for example.

It really does shock me, to be honest with you. We started it five years ago and I think we were definitely the first company of our type looking at presenting the issue and making the wider public aware of it. I’m consistently shocked by the numbers, especially those about children. The fact that just one of the four factors we looked at [darkness, dampness, coldness and noisiness] can lead to a higher chance of poor health is startling.

How do you want national governments, regional bodies and so on to use the findings your company has helped put together?

The point of supporting this work is for other companies, and legislators, to take on their responsibilities like we are. Velux doesn’t have the solution to all the problems we’ve raised, far from it, but all our product innovations are at least aimed at resolving some of these issues. I would like manufacturers of mechanical ventilation, for example, to look at this and say ‘ok, what can we do about it?’ If other companies don’t take into account the impact their products have on the actual reality in people’s homes, by digitalising, adding sensors, making sure their solutions are maintained, then we’re all the poorer for it. Basically, I hope the barometers are thought-provoking for designers, architects and more.

How do you go about sharing knowledge, best practices, in this sector? Is there a communication problem?

I definitely think we could do more.

It’s clear when you look at the building sector that for too long we’ve thought of each other as just steps in a value chain. What we actually need to do is share the issue among us, because you can’t solve it by just looking at your own small part of the chain.

The need to up renovation rates is clear but, and you mentioned maintenance before, little is said about what to do once the renovating is complete. Is that an issue that will take on greater importance?

Ideally, yes, people would think more about maintenance. It tends to be something people address when something breaks. Digitalisation can help to some degree, because I’m a firm believer that designing and renovating buildings in the future will begin by creating a digital copy of that building. That copy should enable simulations, which could help the development of predictive maintenance. There’s also the role of IoT and machine to machine connections. Take our factories, for example, we don’t wait for a machine to break. Sensors and algorithms tell us when components are expected to break or wear out. That saves a fortune and I believe we can get there in buildings. We’re not there yet.

What are the main obstacles to that at the moment?

A little bit cost, of course, but the price of sensors and machine learning is coming down so fast right now that it will become something that is more possible. Eventually, building owners will come to the same conclusion factory owners have already had, namely, that connecting components can decrease overall costs. The most expensive time to fix something is when it’s broken.

The Energy Performance of Buildings Directive (EPBD) was widely hailed as a strong piece of legislation when it was finalised. How involved were you and the rest of the industry when it was being put together?

I have to say, to the credit of the European Commission that worked on that directive, I think it was exemplary work. We absolutely participated wholeheartedly in the drawing up of that legislation. It was a good example of how legislators can work hand-in-hand with the industry, not in a lobbying sense where everybody is just out for their own interests but following a desire for some sort of collective good. We were quite happy with it.

Where does the Healthy Buildings Barometer go from here? Any indications what a sixth edition would look at?

What I would reflect upon is that we’ve identified a problem: the health of buildings and the impact on the health of people that spend time in them. There’s a huge amount of research done on productivity in different work environments but maybe we haven’t really tapped into the impact on productivity caused by living in an unhealthy home. We know, for example, that if you have proper access to daylight in schools then kids’ academic performance can be boosted by up to 15%. There’s empirical evidence for that. But I wonder how the home environment affects it.

So, quantifying success at school?

Yes, because trying to get people to act more requires hard facts and data. It’s not just about scaring people with stories about asthma and eczema, which is bad but a fact, it’s also about quantifying the upside of getting it right. So that’s probably the direction we’ll look at.
Our buildings are making our children sick

By Ingrid Reumert | VELUX Group

The buildings in which children in Europe are growing up in are making them sick. The youngest generation is losing healthy life years due to the poor state of the homes and schools that they spend much of their youth in. It’s imperative that legislators across Europe implement the EU’s new building directive before the deadline in March 2020.

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1 out of 3 European children live in unhealthy buildings. The homes they live in have deficiencies that negatively affect indoor climates. The scale of the problem varies within individual EU countries, but when compared with the EU average, all countries have significant problems with their building stock. Such problems without remedies are causing health issues amongst the youngest and most vulnerable EU citizens. These are some of the findings of the Healthy Homes Barometer 2019, a scientific-based report on the health of EU buildings.

UNHEALTHY BUILDINGS ARE ROBBING CHILDREN OF HEALTHY YEARS OF LIFE

Living with housing deficiencies puts children’s health at risk. About 10-15 percent of new cases of childhood asthma in Europe can be attributed to exposure to dampness and mould indoors and this translates to more than 37,000 years of healthy, disease-free life lost.

Housing deficiencies include dampness or mould, darkness, noise and cold. Children living in homes with one of the four risk factors are 1.7 times more likely to report poor health. Children who are exposed to all four factors in their homes are strikingly 4.2 times more likely to report poor health.

MORE PRESSURE ON POLITICIANS NEEDED TO ACHIEVE HEALTHY BUILDING SOLUTIONS FASTER

There’s no doubt that the state of Europe’s ageing buildings needs to be dealt with if children’s lives and learning are to improve. However, with the new Energy Performance of
Buildings Directive, Member States must now consider wider benefits, such as health, comfort and well-being, plus natural light when implementing it.

The directive requires that all Member States draft renovation strategies and implement them. This is much needed, considering that only 10 percent of European buildings currently have A or B class energy performance certificates. These long-term strategies should form the basis for how to transform old buildings with deficiencies into places where energy efficiency and indoor climate are conducive to healthy living and learning.

CHILDREN'S LEARNING IS HINDERED BUT THE BILL GOES BEYOND THEIR EDUCATION

Children are not only losing years of healthy living; they are also losing in terms of their learning. Just like in homes, poor indoor climates in schools and day-care centres are linked to causes of serious and sometimes debilitating health conditions.

Each year, diseases related to unhealthy buildings are responsible for European children missing 1.7 million school days. It may not sound like a lot, but it comes on top of other courses of missed school days. And add to this the impact on parents who have to take time off work to care for sick children and the economic consequences add up. Inadequate housing costs EU economies nearly €194 billion a year in direct and indirect costs form healthcare, social services, loss of productivity and reduced opportunities. This is equivalent to 1% of the European GDP per year.

But there are solutions for buildings to address these, one of which is better ventilation possibilities and improvements to other indoor climate conditions. Altogether, improving ventilation in schools and reducing exposure to dampness and mould in homes across Europe could boost the European economy by more than €300 billion by 2060.

But there are also other gains that go beyond budgets and address climate issues. By solving these quite common issues with sound solutions to renovate Europe’s ageing building stock, the negative impact on the environment could also be reduced. Inefficient buildings are responsible for 40 percent of Europe’s energy consumption and over one third of its CO₂ emissions.

EPBD IMPLEMENTATION DEADLINE FAST APPROACHING

We urge Member States to be ambitious in their new national renovation strategies. In July 2018, when the directive was passed, the European Commission set a deadline of 20 months for the implementation of renovation strategies in EU Member States. That deadline will be up in March 2020 and so far, there is little indication of significant progress. This means there’s still a lot to do and the clock is ticking fast!

In the meantime, Europe’s children continue to get sick from the buildings they spend more than 90 percent of their time in. So, the question is, how much longer should they wait for legislators to get the ball rolling on solutions for buildings that will safeguard their health and improve their comfort and well-being while growing up?

As Marjolaine Meynier-Millefer, Member of the French Parliament, said last week at Healthy Buildings Day in Paris, the building sector is in a “vastly underestimated situation” and renovation of buildings needs to be made a priority. She was one of the keynote speakers at the VELUX Group organised annual event, which brought together builders, developers, planners, building owners, architects, scientists and users, to discuss the importance of health and comfort in buildings.

It should be a basic right for all people, and not least children, living in Europe today to not have to worry about their health being affected by sub-optimal conditions in buildings. Parents in particular should be able to raise their children in environments that do not put them at risk of developing health conditions, which in the worst case pursue them throughout adulthood and can even shorten their lives. The pain is obvious, and the cure is simple, so what’s this wait all about? While we wait, more children are becoming ill.