

A need to improve regulations on indoor air quality, thermal comfort and daylight

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As it is estimated that people spend 60 to 90%¹ of their life in indoor environments, there are lingering health and comfort concerns due to the lack of a clear legislative framework, both at the EU and Member State levels. An efficient and healthy building stock should ensure appropriate thermal comfort; indoor air quality and daylight conditions as treating these aspects lightly can have several effects on health, comfort and work performance.

Between 30 to 50% of excess winter deaths can be attributed to cold indoor temperatures², demonstrating the importance of thermal comfort and its link to fuel poverty.³ In 2012, 99 000 deaths in Europe and 19 000 in non-European high income countries were attributable to household (indoor) air pollution⁴. Despite these connections, the national requirements for indoor air quality and thermal comfort are not comprehensive enough, at least in the case of a selected sample of countries, as shown by the latest study by the Buildings Performance Institute Europe (BPIE)⁵.

BPIE identifies gaps in regulation to ensure that European citizens live in highly efficient, healthy, comfortable and well lit buildings. The study analyses how indoor air quality (IAQ), thermal comfort and

daylight are regulated in 8 Member States' legislation for new and existing residential buildings. The parameters studied are: ventilation rates, airtightness, indoor air pollutants, mechanical and natural ventilation, indoor temperatures, humidity and air velocity. Surveyed countries are Belgium (Brussels Region), Denmark, France, Germany, Italy, Poland, Sweden and the UK (England and Wales).

The overview shows that even though all 8 countries acknowledge ventilation's benefits, only 4 Member States make it mandatory. Requirements for heat recovery (see **Map 1**), which can compensate the energy lost from ventilation, are scarce in the national codes for new buildings.

For renovations, legally-binding requirements such as minimum ventilation rates, airtightness or limitation of pollutants can hardly be found in the analysed codes. Thermal comfort, even though often considered as a main driver for the decision of an owner/occupier to invest in renovation, is rarely captured by national and/or European legislations. Few countries check compliance with indoor air quality or thermal comfort standards and if so, mainly at the design stage rather than by performing on-site measurements.

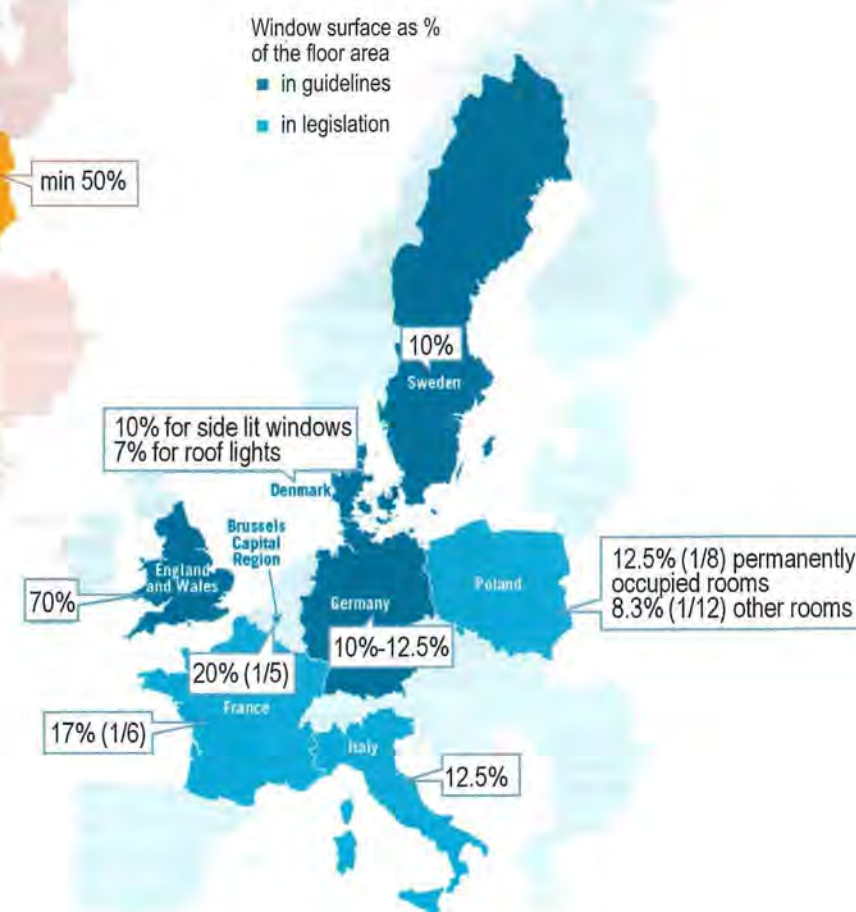
All surveyed countries include at least a basic reference to daylight (an important element to achieving a good indoor environment with a major impact on the inhabitants' health⁶) in their building codes, but only France, Italy and Poland have integrated it into their legislation for new buildings (see **Map 2**). Only some building codes (Brussels, Denmark, Germany) mention the view to outside as an important part of visual comfort. No requirements have been identified across the surveyed codes stipulating minimum daylight preservation when renovating a building, except in the UK where the regulation "Right to Light" is in place. This regulation secures that changes to neighbouring buildings must not reduce daylight availability in existing buildings.

⁶ Lighting Research Center, "Daylighting Resources-Health". Available at: http://www.lrc.rpi.edu/programs/daylighting/dr_health.asp#sad

- No mandatory HR for dwellings
 - HR is mandatory for some dwellings
 - HR is (de facto) mandatory if mechanical ventilation is installed
- (% = efficiency of system)



Map 1. Heat recovery (HR) requirements in Europe. (Source: BPIE)



Map 2. Daylight in legislation. (Source: BPIE)

The report's findings show that indoor health and comfort aspects should be considered to a greater extent in the European and national building codes than it is current practice. The Energy Performance of Buildings Directive⁷ (EPBD), acknowledging the important role of IAQ, clearly states that minimum energy performance requirements "shall take account of general indoor climate conditions, in order to avoid possible negative effects such as inadequate ventilation". But the importance of indoor air quality, thermal comfort and daylight has to be strengthened in a future recast. These

⁷ Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)

aspects could be integrated in the Energy Performance Certification process as relevant information of the actual living conditions in the building. The co-benefits of thermal comfort and a healthy indoor environment should be taken into account when assessing the macroeconomic impact of energy renovation measures (e.g. reduction of health service costs). Such requirements should also be reflected in national renovation strategies as developed under Articles 4 and 5 of the Energy Efficiency Directive. Any further regulations aiming to reduce energy consumption should account for possible emerging conflict situations that could negatively affect indoor climate. ■

¹ Health and Consumer Protection Directorate General, "Promoting actions for healthy indoor air", 2011

² World Health Organization, "Environmental burden of disease associated with inadequate housing", http://www.euro.who.int/_data/assets/pdf_file/0003/142077/e95004.pdf

³ Some of these factors and consequences were previously studied by BPIE in the 2014 study "Alleviating fuel poverty in the EU. Investing in home renovation, a sustainable and inclusive solution". Available at: http://bpie.eu/fuel_poverty.html

⁴ World Health Organisation, "Burden of disease from household air pollution for 2012"

⁵ BPIE, "Indoor air quality, thermal comfort and daylight - An analysis of residential building regulations in 8 Member States", 2015. Available at: <http://bpie.eu/indoor.html>