Indoor Spanish air quality regulation reinvented: research as the pathway from prescriptive to performance-based regulations

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ABSTRACT

This communication examines the crucial role of pre normative research in the development of effective regulatory frameworks for indoor air quality in buildings. Pre normative studies provide the scientific basis needed to understand pollutant dynamics, evaluate ventilation performance under realistic conditions, and determine how regulatory requirements can best protect occupants while supporting energy efficient building design. By grounding regulations in evidence rather than rigid prescriptions, policymakers can create standards that are both technically robust and capable of adapting to new technologies and building practices.

The article highlights the recent revision of Spain's Documento Básico HS3, which is part of the Spanish Building Code (Código Técnico de la Edificación, CTE), and governs national regulations relating to indoor air quality in residential buildings. The updated version reinforces a performance-based approach, shifting the focus from predefined solutions to the achievement of measurable outcomes related to air renewal and pollutant control. This shift encourages the adoption of more efficient ventilation strategies, including demand-controlled systems and advanced mechanical solutions that can better respond to real patterns of occupancy and use.

A significant consequence of this research driven revision was the possibility of reducing minimum ventilation flow rates. Earlier regulatory versions assumed continuous occupancy of all rooms, leading to conservative requirements that often resulted in oversized systems and unnecessary energy consumption. The new approach is grounded in simulation studies that incorporate realistic occupancy scenarios, acknowledging that dwellings are used dynamically and that not all spaces require constant ventilation at maximum rates. By integrating these findings, the regulation achieves a more balanced relationship between indoor air quality, energy performance, and practical building operation.

Overall, the article argues that pre normative research is essential for designing regulations that effectively protect public health while remaining aligned with contemporary building practices and sustainability goals. The evolution of DB HS3 demonstrates how evidence-based policymaking can lead to more flexible, efficient, and context appropriate standards for indoor air quality in residential environments.

KEYWORDS

Regulations, performance-based, research, IAQ