



webinar
2025.10.10

Comparing Ventilation Trends in Southern Europe: Italy, France & Spain



Agenda (CET)

- 10:00 | Introduction: Presentation of the series of AIVC VIPs on building ventilation requirements and inspection, *Nolwenn Hurel (Cerema, France)*
- 10:05 | National trends and requirements in Italy, *Aldo Fumi (ASSOCLIMA, Italy)* & *Luca Alberto Piterà (AiCARR, Italy)*
- 10:20 | Questions and answers
- 10:30 | National trends and requirements in France, *Valérie Leprince (Cerema, France)*
- 10:45 | Questions and answers
- 10:55 | National trends and requirements in Spain, *Pilar Linares-Alemparte (IETcc-CSIC, Spain)*
- 11:10 | Questions and answers
- 11:30 | End of the webinar

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INTRODUCTION – AIVC VIPs ON BUILDING VENTILATION REQUIREMENTS AND INSPECTION

AIVC Webinar – Nolwenn Hurel (Cerema)

October 10, 2025

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VIP series on Building Ventilation

- Series of Ventilation Information Papers (VIP) published by the AIVC
 - “Trends in building ventilation requirements and inspection ”
 - Similar to the Building & Ductwork Airtightness VIP series (13 papers)
 - Template prepared: **similar structure** for all papers
 - Authors found in various countries via the **AIVC** board members
 - Available on the AIVC website:
<https://www.aivc.org/collection-keys/vip>



VIP series on Building Ventilation

- **Content: National trends in**
 - **IAQ requirements** and ventilation systems for residential and non-residential buildings
 - **energy requirements** and other drivers in energy performance, past & foreseen changes
 - **the inspection of ventilation systems:** requirements and protocols
 - **innovative systems and market**
 - the impact of the **COVID-19**



VIP series on Building Ventilation

- Content: Example of mandatory flowrate for typical buildings
 - House of 90 m² - 3 bedrooms
 - Apartment of 50 m² - 1 bedroom
 - Classroom of 50 m² - 25 students
 - Office of 12 m² - 1 occupant



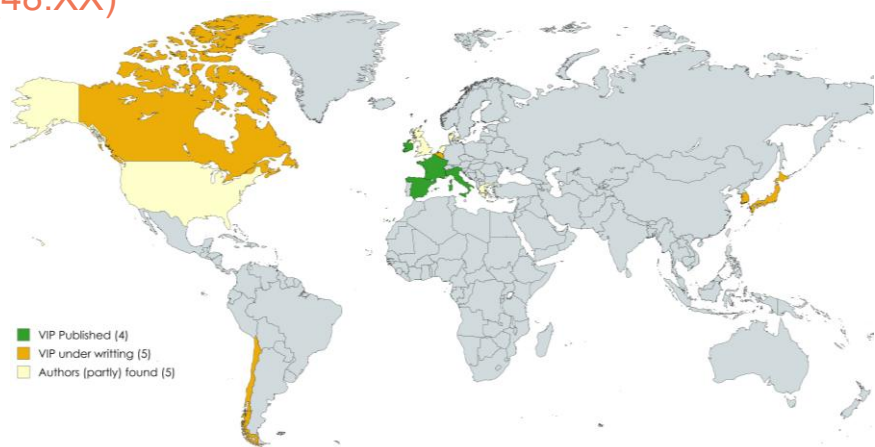
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VIP series on Building & Ductwork Airtightness

4 VIPs published (48.XX)

- 48.1 Spain
- 48.2 France
- 48.3 Ireland
- 48.4 Italy

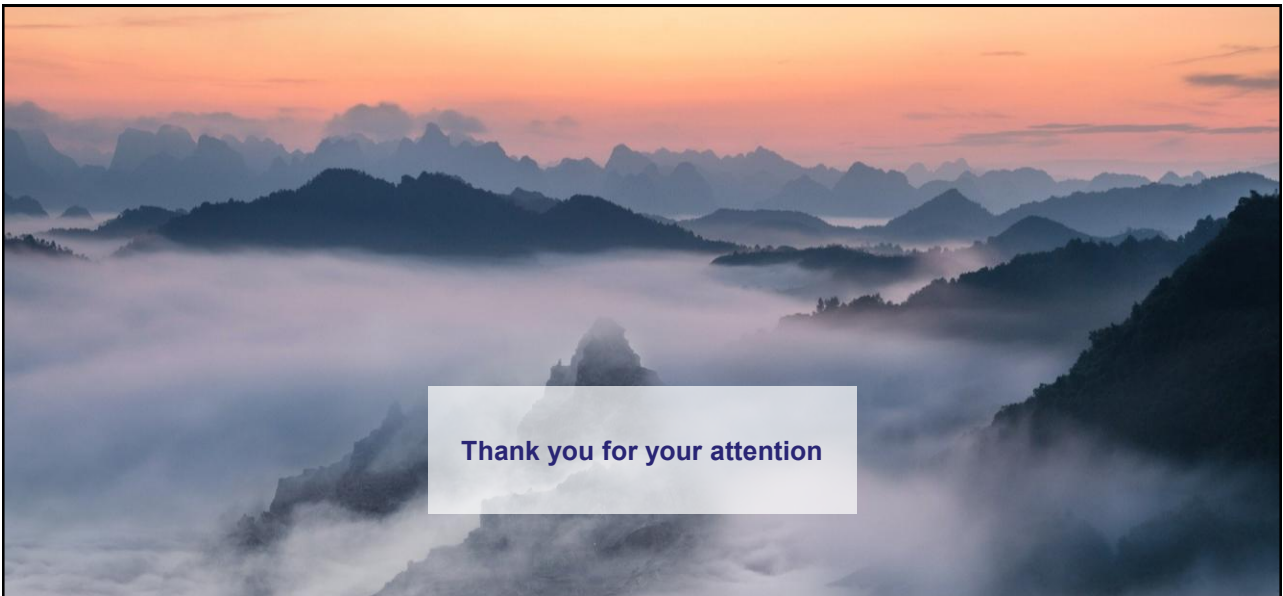
(Belgium : under review)



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Webinar program:

- Comparing Ventilation Trends in Southern Europe:
 - **Italy** – Aldo Fumi (ASSOCLIMA, Italy) & Luca Alberto Piterà (AiCARR, Italy) **15' (+10')**
 - **France** – Valérie Leprince (Cerema, France) **15' (+10')**
 - **Spain** – Pilar Linares-Alemparte (IETcc-CSIC, Spain) **15' (+20')**



Thank you for your attention

Trends in building ventilation requirements and inspection in Italy An image of the market

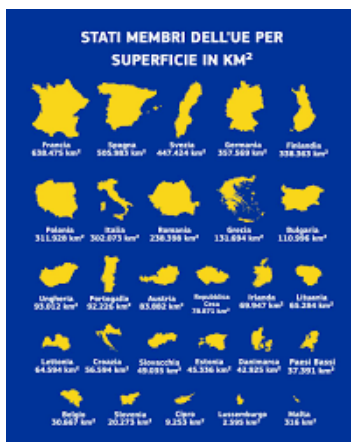
The Mechanical Ventilation in Italy

**MECHANICAL
VENTILATION TYPES:**
EXHAUST, SUPPLY,
BALANCED &
ENERGY RECOVERY

Aldo Fumi, Head of Ventilation units and Air Treatment in Residential Buildings – ASSOCLIMA
Luca A. Piterá, AICARR Technical Secretary
Marco Simonetti, Politecnico di Torino Department of Energy "Galileo Ferraris"
Michele Zinzi, ENEA Energy Technologies and Renewable Department

1

Italy: Surface and Population

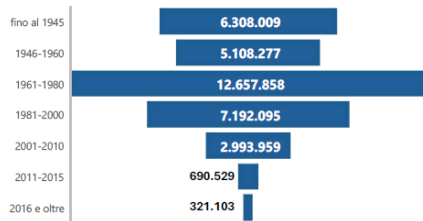


	Population (thousands)	% 0-14	% 15-64	% 65+
1.1.2023	58,850	12.5	63.4	24.1
2050				
UN	52,428	11.1	51.7	37.1
ISTAT	54,165	11.7	53.4	34.9
Eurostat	57,519	11.2	55.1	33.7
2070				
UN	44,455	10.9	51.8	37.4
ISTAT	47,722	11.6	54.3	34.1
Eurostat	53,333	10.9	55.5	33.6

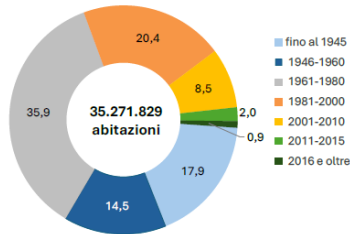
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The Italian Building Stock

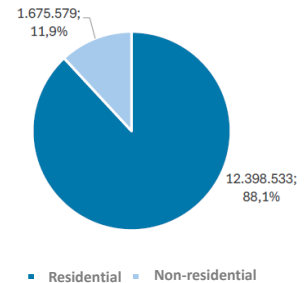
Absolute values @ 2024



Composition % @ 2024



The Italian Building Stock @ 2021



A **very dated** housing stock... almost **70%** of homes built **before** the issuing of **anti-seismic** (1974) and **energy efficiency** regulations (1976)... over half of homes date back to '45-'81... over 40 years old... **maintenance** interventions **essential**.

Source: «Osservatorio congiunturale sull'industria delle costruzioni». January 2025

* Net of ownership transfer costs

3

The Italian Building Stock: a missed opportunity

The **Superbonus 110%**... a building incentive measure introduced in May 2020... until 2023... provided for a series of **subsidies**, **deductions** and **reimbursements** for building works aimed at **modernizing buildings** and infrastructure, improving their **energy efficiency**... stimulating and reviving the construction sector after the COVID-19 pandemic.

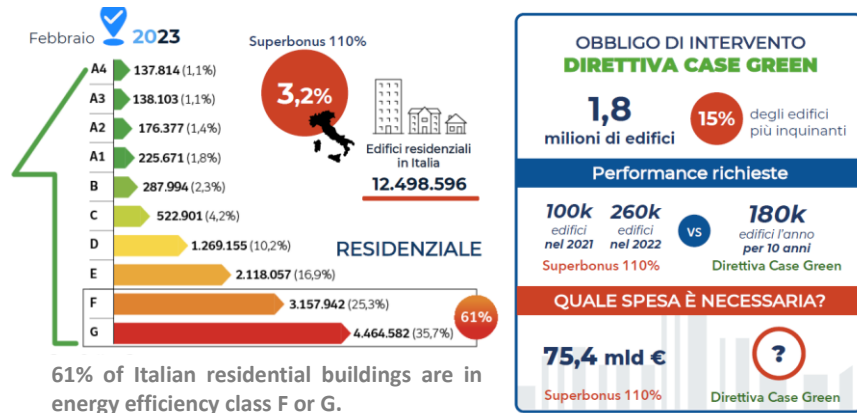
Mechanical ventilation... **not initially included** among the measures eligible for incentives... then added, but with **too low spending limits**... often overlooked... problems in renovated premises (excessive humidity... mould growth on walls and ceilings...)... compensated for by **ex-post** actions... **push-pull** units



4

The Italian Building Stock: a missed opportunity

How far do we still have to go?



Source: Nomisma

5

The Italian Construction Sector

In 2025 investments in constructions... **-7%** vs 2024... drop of extraordinary housing maintenance... **-30.0%**... lower fiscal advantages... no more discount on the invoice...

Private investments in **non-residential** buildings recovery... **-2,5%**

Public sector... **+16%**... end of **PNRR** (NextGenerationEU Plan)

Construction investments forecast

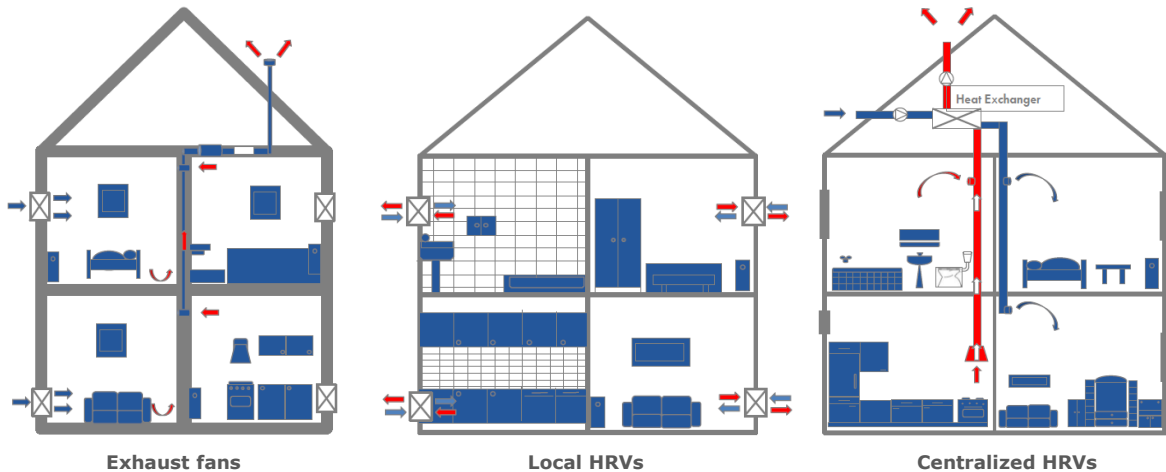
	2024 Milioni di euro	2022	2023	2024 ^(*)	2025 ^(*)
		Variazioni % in quantità			
COSTRUZIONI	223.467	8,9%	16,5%	-5,3%	-7,0%
ABITAZIONI	107.572	17,3%	14,5%	-19,8%	-25,8%
- nuove	16.406	3,3%	2,3%	-5,2%	-2,6%
- manutenzione straordinaria	91.166	20,0%	16,5%	-22,0%	-30,0%
NON RESIDENZIALE PRIVATO E OPERE PUBBLICHE	115.895	-0,8%	19,3%	13,6%	10,4%
Non residenziale privato	37.398	-11,3%	10,4%	0,7%	-1,4%
- privato nuovo	7.318	-43,6%	3,6%	0,5%	3,2%
- manutenzione straordinaria	30.081	4,5%	12,2%	0,8%	-2,5%
Opere Pubbliche	78.496	7,5%	15,0%	21,0%	16,0%

Source: «Osservatorio congiunturale sull'industria delle costruzioni». January 2025

* Net of ownership transfer costs

6

The Mechanical Ventilation in Italy: types of products



7

The Mechanical Ventilation in Italy: a historical perspective

Mechanical ventilation... historically **not a priority** in Italy..., air exchanges achieved through **natural ventilation**... windows openings... not only in **homes**, but also in non-residential buildings... **schools** (primarily public), **offices**, **sports facilities**...

The **Mechanical Ventilation** only **mandatory** for **rooms without openings** to the outside, or where the **ratio** between the **openable surface area** and the **floor area** is $< 1/8$... intermittent extractor fans the most popular solution



8

The Mechanical Ventilation in Italy: the market of residential units

In the last decade... a **strong rise** of **local HRVs**... 10% of unit share in 2018... 20% in 2022... **declining sales** in **2023** and **2024**... mounting economic pressures.

Push & pull units... under increasing **pricing pressure**.

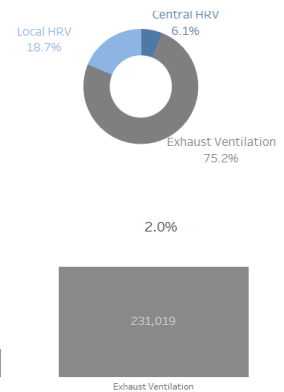
Centralized HRVs... mainly installed in **new buildings**...

Exhaust fans... **stable, mature** segment

The evolution of the Italian Ventilation market (N° of units)



The market by product type

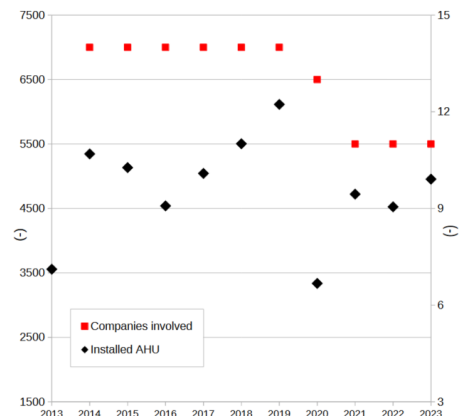


Source: Interconnection Consulting

9

The Mechanical Ventilation in Italy: the market of non-residential units

- **Commercial HRVs and AHUs** sold in 2023: about **13.000** units
- ~ **70%** equipped with **plate heat exchangers**
- ~ **80%** equipped with **water coils**
- **Steady growth** in **2016-2019**... financial incentives... **collapse** in 2020... COVID-19 pandemic... **partial recovery** in 2021-2024
- **85%**... small/medium-sized units (flow rates $\leq 15.000 \text{ m}^3/\text{h}$)... only **2%** $> 50.000 \text{ m}^3/\text{h}$



Source: Eurovent – Annual Statistics Results 2024

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The Mechanical Ventilation in Italy: the expected future

The new regulatory framework will push the sales...

- National Decree 2022/183 sets **Minimum Environmental Criteria (CAM)** for the design and construction of buildings, including aeration, **ventilation and indoor air quality**... imposing **minimal classes of IAQ** for New buildings and Major 1st level Renovations ($\geq 50\%$ of the building's volume) as well as for Major 2nd level Renovations ($\geq 25\%$ of the building's volume).
- A further boost is expected from the implementation of the **2024/1275 (EPBD IV) Directive**, combining energy saving and greenhouse gas emission reduction with the **protection of the health, well-being and comfort** of occupants, specifying that renovations must **"improve the quality of indoor environments"** ... **"better health and greater well-being are important ancillary benefits of increased energy performance in buildings"**.



Source: Eurovent – Annual Statistics Results 2024

Trends in building ventilation requirements and inspection in Italy An image of the market

Thanks for your kind attention!



1



2



3

GENERATING IDEAS FOR SUSTAINABLE ENERGY

Building Ventilation in Italy: Legislative & Standards Overview

- ✓ **Aim:** overview of binding legislation & technical standards for ventilation in Italy.
- ✓ **Context:** national laws + 20 Regions / 2 Autonomous Provinces; focus here is national framework.
- ✓ **Historically:** reliance on airing; MV required only in two cases.
- ✓ **Legal minimums** (Health Decree 5 July 1975):
 - ✓ windowless toilets;
 - ✓ rooms with openable-window/plan-area < 1/8 → MV required.

Aldo Fumi, ASSOCLIMA - Marco Simonetti, Politecnico di Torino - Michele Zinzi, ENEA - Luca A. Piterà - AiCARR

4



Residential IAQ: From UNI 10339 to UNI EN 16798-1

- ✓ **UNI 10339:1995** (design standard) – typical fresh-air rate: $11 \times 10^{-3} \text{ m}^3 \cdot \text{s}^{-1}$ per person ($\sim 40 \text{ m}^3 \cdot \text{h}^{-1}$); extraction in kitchens & toilets.
Withdrawn without replacement since July 2024.
- ✓ Alternative close reference now only for IAQ: UNI EN 16798-1:2019 (IAQ, thermal, lighting, acoustics). Transposed in Italy; formally adopted for public residential buildings via Decree June 2022 - Minimum Environmental Criteria (CAM).
- ✓ Four IAQ categories (I–IV); three alternative methods for airflow sizing in dwellings (by floor area; by beds; hybrid).



Non-Residential Ventilation & CAM (2022)

- ✓ **Historically UNI 10339:1995** also used for non-residential (examples: $5.5 - 11 \times 10^{-3} \text{ m}^3 \cdot \text{s}^{-1}$ per person by space type).
- ✓ Specific building types covered by dedicated laws/decrees (**schools: D.M. 18/12/1975; healthcare: D.P.R. 14/01/1997**).
- ✓ **CAM Decree 23/06/2022 (Minimum Environmental Criteria)** — key ventilation provisions: new buildings/major renovations ($\geq 50\%$ external surface): ensure UNI 10339 rates or meet EN 16798-1 Class II; second-level renovations ($\geq 25\%$ external surface): Class II accepted, Class III allowed if justified.
- ✓ **Schools – DPCM 26/07/2022**: guidelines for air purification device and MV and mandatory monitoring (CO_2 , formaldehyde, benzene, $\text{PM}_{10}/\text{PM}_{2.5}$, T, RH) + technical measures to ensure acceptable IAQ.



GENERATING IDEAS FOR SUSTAINABLE ENERGY



Energy Performance & Ventilation (Decrees + UNI/TS)

- ✓ **2015 Ministerial Decrees:** national methodology & minimum energy requirements; certification uses semi-steady monthly method.
- ✓ **UNI/TS 11300-1/2/3:** calculation of ventilation & infiltration energy; modules for natural/MV/hybrid, night cooling; control efficiency factors (presence, CO₂, RH).
- ✓ No absolute whole-building energy limit; performance is relative to a national reference building.
- ✓ **Minimum electrical use for MV systems** (energy per m³ moved): ~ 0.25 – 0.5 Wh·m⁻³ depending on system type.
- ✓ **EPBD 2024/1275** (implementation pending) will tighten the energy–comfort–health linkage.



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7



GENERATING IDEAS FOR SUSTAINABLE ENERGY



Inspection & Hygiene: Obligations and Protocols

- ✓ **Legislative Decree 81/2008:** HVAC systems must be periodically checked, maintained, cleaned, sanitized to protect workers' health; remove hazardous deposits promptly.
- ✓ **State–Regions Agreements: 2006:** predictive maintenance protocols; planning; hygiene requirements; personnel qualification. In **2013:** operational procedure for risk assessment & management of air-handling hygiene; visual & technical inspections; inspection frequency based on prior results.
- ✓ **UNI EN 15780:** duct cleanliness criteria; cleanliness classes (Low/Medium/High).
- ✓ Indicative limits & frequencies: e.g., 0.075 g·m⁻² PM in clean unlined ducts; scheduled frequencies for AHUs/filters/humidifiers/ducts/terminals; maintenance register required.
- ✓ Today: no legal obligation to verify energy/IAQ/acoustic/thermal performance of MV systems during inspection



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**Ventilation
Information
Paper**
n° 48.4
May 2025

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Trends in building ventilation requirements and inspection in Italy

Aldo Fusi, ASSOCIABA
Luis A. Pitará, ACARR
Marco Simonetti, Politecnico di Torino
Michele Zeri, IFPA

Ventilation Information Papers (VIP) are a series of typically short AIVC publications (in most cases 6 to 10 pages) intended for giving a basic knowledge of some aspects related to the air infiltration and/or the ventilation.

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VIP 48.4: Trends in building ventilation requirements and inspection in Italy | 2025 | English | 12 pp

AIVC's Ventilation Information Paper #48.4 summarizes current knowledge on trends in building ventilation requirements and inspection in Italy.

Aldo Fumj, Luca A. Piterà, Marco Simonetti, Michele Zinzi

1 General introduction

This information paper aims, for the first time, to provide information on ventilation needs in Italy. The main topics analysed are the regulatory framework and the market evolution.

The country has 20 Regions and 2 autonomous provinces. Its infrastructure consists of the energy network, water and sewerage, which includes the surface water supply, and the sewerage and wastewater treatment system. The sewerage system is less than 1/8th of the surface area lower than 1/8th.

In the last decades, the trend has been changing rapidly due to several factors: strong energy requirements for new buildings, a rise in deep-building renovation driven by favourable financial incentives, as well as both global and local governments that significantly increased the sanitation rates for the installation of conditioning systems, mainly for schools and hospitals.

What happens to mechanical ventilation requirements and the market in the coming years will be strictly connected with the contents and measures of the national implementation regulation of the Italian version of the Energy Performance of Buildings Directive. 2016/1318.

Historically, mechanical ventilation has not been a major concern in the country, as in other Mediterranean nations, since air is not usually



Aldo Fumi, ASSOCLIMA - Marco Simonetti, Politecnico di Torino - Michele Zinzi, ENEA - **Luca A. Piterà** - AiCARR

Towards Healthy and Decarbonised Buildings



Aldo Fumi, ASSOCLIMA - Marco Simonetti, Politecnico di Torino - Michele Zinzi, ENEA - **Luca A. Piterà - AiCARR**



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TRENDS IN BUILDING VENTILATION REQUIREMENTS AND INSPECTION IN FRANCE

Valérie Leprince, Laure Mouradian, Gaëlle Guyot

October 2025 AIVC-Tightvent Webinar

1

Background Information



• France Overview

- 68 million inhabitants (2023)
- 37.2 million dwellings (2022), with 50% built before 1974
- New construction in 2023: 16,059 single-family homes, 205 multi-family buildings, and various offices and educational buildings

• Building Types

- Houses (79%, avg. 100 m²)
- Apartments (21%, avg. 64 m²)

2



Regulatory Framework for Ventilation

- Residential Ventilation Regulations:
 - Began with the “Arrêté du 24 mars 1982”
 - Main requirements:
 - Continuous air renewal
 - Air inlets in main rooms and exhausts in humid rooms
 - Specific air flow rates per room type
 - Reduced flow rates, notably for kitchens (2 stages airflows)
 - 1983: Introduction of demand-controlled ventilation (DCV) systems

Number of main rooms	Achievable exhaust air flow rate (m³/h)				
	Kitchen	Bathroom with toilet	Other bathroom	Toilet	
				First one	Others
1	75	15	15	15	15
2	90	15	15	15	15
3	105	30	15	15	15
4	120	30	15	30	15
5 and more	135	30	15	30	15
Number of main rooms	Minimum values of reduced exhaust air flow rates (m³/h)				
	Without demand controlled ventilation		With demand controlled ventilation		
	Total Exhaust	Kitchen	Total exhaust		
1	35	20	10		
2	60	30	10		
3	75	45	15		
4	90	45	20		
5	105	45	25		
6	120	45	30		
7	135	45	35		



Regulatory Framework for Ventilation

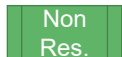
- Residential Ventilation Regulations:
 - Began with the Arrêté du 24 mars 1982
 - Main requirements:
 - Continuous air renewal
 - Air inlets in main rooms and exhausts in humid rooms
 - Specific air flow rates per room type
 - Reduced flow rates, notably for kitchens (2 stages airflows)
 - In 1983, Introduction of demand-controlled ventilation (DCV) systems
- NF DTU 68.3: National standard for the design of ventilation systems
- Cooker-hood are not mandatory, they are assumed not to be needed thanks to this two-stages flowrate, usually only recirculation cooker-hood are installed in order to comply with EP-requirements on airtightness.



Regulatory Framework for Ventilation

• Residential Ventilation Regulations: Example

- A house of 90 m² (2.5 m height), 1 main room, 3 bedrooms (1 master (2 adults) , 2 kids), 1 kitchen, 1 bathroom and 1 toilet.
- Flowrate to extract permanently are:
 - 30 m³/h in the bathroom
 - 30 m³/h in the toilet
 - 45 m³/h in the kitchen and it must be possible to reach 120m³/h during cooking events (1 hour per day in average)
- In case of DCV the minimum flowrate can be reduced, according the values given in the “Avis techniques” agreements for each size of dwelling. This induces a reduction of 30 to 50% of the average flowrate with most of the systems.



Regulatory Framework for Ventilation

• Non-Residential Regulations:

- Based on 2 regulations :
 - Work Code (1979)
 - “Reglement Sanitaire Départemental Type” (RSDT)
- Requirements for both general rooms and rooms with specific pollution sources (toilets, etc.)
- Ventilation can be stopped; the modulation of flowrate is allowed and recommended by the EP Regulation
- No standard to describe the design and installation of non-residential ventilation systems. EN standards apply but not mandatory

Kind of enclosure	Q _{min} (m ³ /h) per occupant	
	Smoking not allowed	Smoking allowed
School	15	-
High-school and university	18	25
Sleeping spaces (dormitory, etc.)	18	25
Office rooms	18	25
Meeting rooms	18	30
Shops	22	30
Bar and restaurant	22	30
Gymnasium (per athlete)	25	30
Swimming pool	22	30
Gymnasium (per onlooker)	18	30

Regulatory Framework for Ventilation

• Non-Residential Regulations: Examples

- In a class room of 50 m² with 25 students and 1 teacher
 - the flowrate depends from the age of the kids
 - from 15 m³/h for the youngest to 18m³/h in high schools and universities,
 - as a worker the teacher shall have 25 m³/h
 - **So the total for a class with young children is $15 \times 25 + 25 \times 1 = 400$ m³/h.**
 - The installation of a ventilation system is not mandatory if the area of the windows in the room is sufficient.
 - => few existing schools are equipped with mechanical ventilation
- In an office of 12 m² with 1 occupant : 25 m³/h

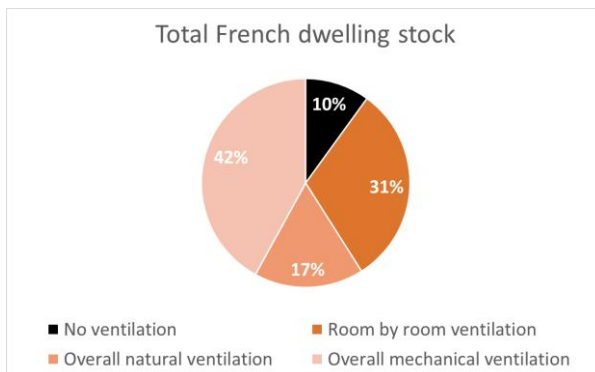
Energy Requirements (RE2020)

- Energy Performance Regulation – new buildings
 - RE2020 sets guidelines for low-energy buildings, replacing RT2012
 - Focuses on air flow rates, energy use, heat recovery, and airtightness
 - DCV Systems are promoted
 - Assessment of energy saving through Avis Techniques
- Energy Efficiency Measures – existing buildings
 - "MaPrimeRenov'" subsidizes if MVHR systems
 - EP certificates now include ventilation system (general) information

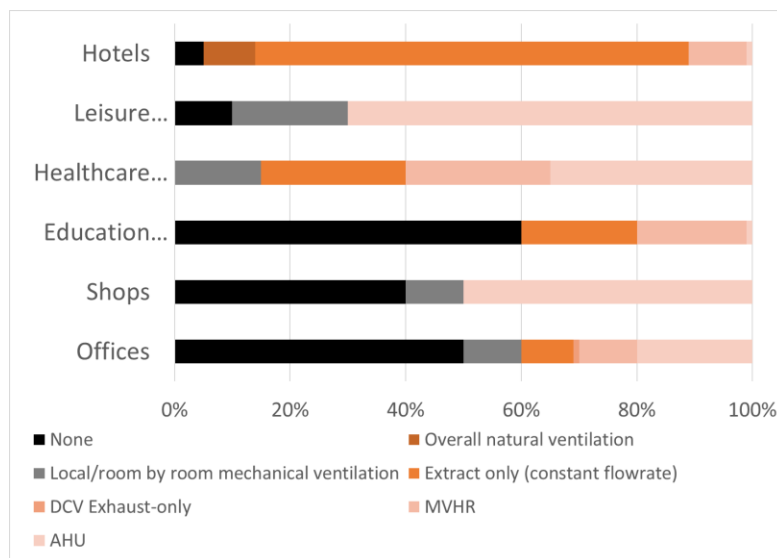
Ventilation Systems in the French existing stock for residential buildings

- Common Systems for new residential systems
 - Centralized mechanical exhaust systems dominate
 - Humidity-based DCV systems are prevalent in new residential buildings (>90%)
 - MVHR in only 3-4% of new dwellings

Existing Stock (Insee 2017)



Ventilation Systems in the French existing stock for non-residential buildings



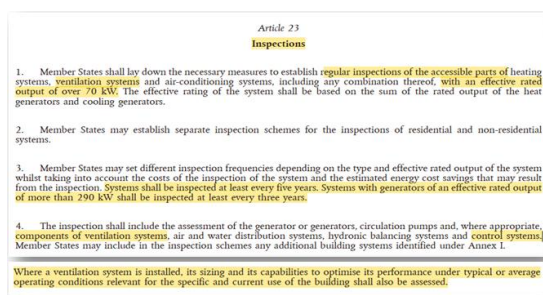
AIR.H, Installation de ventilation dans lextant : enjeux et propositions d'amélioration à travers les diagnostics-Report for ADEME, (2007).

Ventilation Inspection Trends

- **Buildings:**
 - High non-compliance rate: 50% of ventilation systems do not meet regulatory standards, 70% for houses
- **Residential Buildings:**
 - New Inspection Requirement in the new RE2020 (EP) Regulation
 - Mandatory inspection by certified inspectors for residential buildings
 - Focus on visual inspection, system performance, and airflow/pressures measurement
 - A new database

Ventilation Inspection Trends

- **Non-Residential Buildings:**
 - No mandatory inspection, but protocols exist
- **New EPBD requirements**
 - Mandatory inspection of systems when heating and cooling power exceed 70kW (every 5 years) or 290kW (every 3 years)
 - States have 2 years to implement this requirement!.. By March 2026



Challenges and Innovations

- **Performance-Based Regulation (coming soon...)**
 - Moving from prescriptive to performance-based systems
 - Targets for CO₂ levels, humidity, and proxi pollutants
 - Promotes innovative systems beyond humidity-based DCV
 - (See our presentation in dedicated topical session)
 - **COVID-19 Impact**
 - Increased interest in air quality monitoring (e.g., CO₂ sensors in schools)
 - The ministry asked HCSP (high council for public health) for guidance on how the regulation shall change following lessons learned with COVID (published in 2024): HCSP recommends:
 - Modify codes air flow rates to match the "average" of 16798-1 (a big x2 on schools)
 - Bring existing buildings with or without ventilation systems up to these levels, and do more airing by then
 - implement demand-controlled systems
 - implement monitoring and therefore establish IAQ criteria for this monitoring....
- => We hope this will at last bring a new regulation for Non-residential!



Conclusion

- **Key Takeaways:**
 - France has a strong regulatory framework for ventilation in residential buildings but faces challenges with non-compliance and outdated non-residential regulations
 - In non residential buildings like existing schools, air renewal is still mainly based on the opening of windows
 - RE2020 emphasizes energy efficiency in ventilation systems, with mandatory inspections newly introduced for residential buildings
 - Innovation is expected with the shift towards performance-based regulations
- **Future Outlook:**
 - Expected review of non-residential regulations and continued innovation in ventilation technologies

References

• Key sources:

- AIVC VIP n° 48.2 published in November 2024
- R. Jobert, G. Guyot, Detailed analysis of regulatory compliance controls of 1287 dwellings ventilation systems, in: Proc. 34th AIVC–3rd TightVent–2nd Cool Roofs'–1st Venticool Conf., Athens, Greece, 2013
- V. Leprince, B. Poirier, G. Guyot, How to create a performance-based regulation on ventilation – the French Experience, in: Copenhagen, Denmark, 2023.
- R. Jobert, A. Litvak, G. Guyot, L. Deleersnyder, Presentation of a national consultative body on ventilation issues: actors, working groups and projects overview, in: Smart Vent. Build., Juan les Pins, France
- Mélois, A.B., Moujalled, B., Guyot, G., Leprince, V., 2019. Improving building envelope knowledge from analysis of 219,000 certified on-site air leakage measurements in France. Building and Environment. <https://doi.org/10.1016/j.buildenv.2019.05.023>



Thank you for your attention !

Requirements on IAQ in buildings with sensitive populations or those exposed over long periods

- Day-care centers, schools, high schools, facilities for the disabled and juvenile detention centers (2010 updated the 1st of January 2023)
- Imposes the monitoring of IAQ at some specific point of the building life.
- Pollutants measured are CO₂, benzene and formaldehyde
- In case of non-conformity an action plan shall be set.



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	Requirements on ventilation of dwellings
	Ventilation systems in residential buildings stock and market
	Requirements on ventilation of non-residential buildings
	Ventilation systems in non-residential buildings stock and market
	Trends in the inspection of ventilation systems
	Trends in innovative systems and market
	Conclusions
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Requirements on ventilation of dwellings

Goal



Documento Básico HS

Salubridad

HS 1 Protección frente a la humedad
HS 2 Recogida y evacuación de residuos
HS 3 Calidad del aire interior
HS 4 Suministro de agua
HS 5 Evacuación de aguas
HS 6 Protección frente a la exposición al ruido

20 de diciembre de 2019

Buildings shall be provided with means so that they can be suitably ventilated, and contaminants produced during normal use can be removed. A sufficient flow of external air must be provided and indoor polluted air must be extracted

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Requirements on ventilation of dwellings

Performance

Maximum CO₂ yearly average concentration

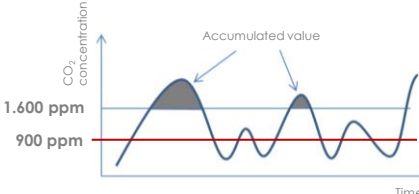
900 ppm

Maximum CO₂ accumulated value per year

500000 ppm per hour accumulated above 1600 ppm

Minimum constant flow rate

1.5 l/s



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Requirements on ventilation of dwellings

Simulation

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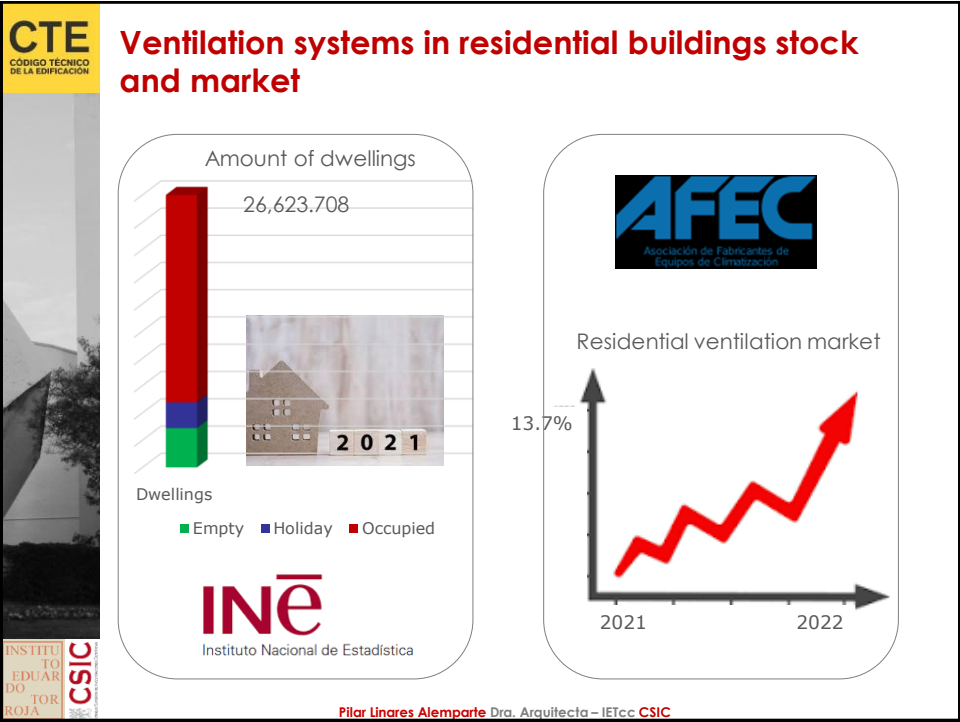
Requirements on ventilation of dwellings

Deemed-to-satisfy solutions

Type of dwelling	Minimum constant ventilation flow [l/s]				
	Dry rooms			Wet rooms	
	Master bedroom	Bedrooms	Dining and living room ⁽¹⁾	Global minimum	Minimum per room
0 or 1 bedrooms	8	-	6	12	6
2 bedrooms	8	4	8	24	7
≥ 3 bedrooms	8	4	10	33	8

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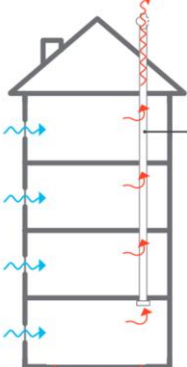
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Ventilation systems in residential buildings stock and market

From 2006:

- mechanical or hybrid ventilation (fully natural ventilation not allowed)
- specific air inlets: microventilation or trickle vents

Most common: hybrid ventilation






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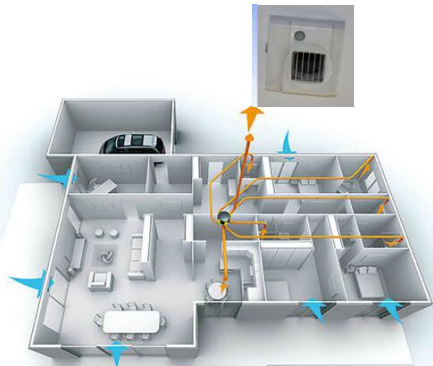
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Ventilation systems in residential buildings stock and market

Second most common: mechanical extraction (single flow)








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Ventilation systems in residential buildings stock and market

Increasingly more common: mechanical extraction and supply with heat recovery (double flow)

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Requirements on ventilation of non-residential buildings

Objective

Ventilation system must provide for enough outdoor air flowrate that avoids the accumulation of high concentration of pollutants according to table

Table. IAQ categories (RITE)

IAQ categories	Examples
IDA 1 (optimal)	Hospitals, kindergardens
IDA 2 (good)	Offices, museums, classrooms
IDA 3 (average)	Shops, cinemas, restaurants, gyms
IDA 4 (poor)	Laundry rooms

Paraninfo

Reglamento de Instalaciones Térmicas en los Edificios

Real Decreto 1027/2007 de 20 de julio de 2007

Actualizado según el Real Decreto 240/2013 de 5 de abril

Índice Normativo Técnico Complementario

Edición 2013 Normas y Actualizada

RITE

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Requirements on ventilation of non-residential buildings

Verification methods

5 methods:

- airflow per occupant indirect method
- airflow per net floor area indirect method
- perceived air quality direct method
- CO₂ concentration direct method
- dilution method.

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Ventilation systems in non-residential buildings stock and market

Amount of properties

2.000,000

Properties

■ Non residential

GOBIERNO DE ESPAÑA

MINISTERIO DE HACIENDA

SECRETARÍA DE ESTADO DE HACIENDA

DIRECCIÓN GENERAL DEL CATÁSTRO

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Ventilation systems in non-residential buildings stock and market



From 2021 to 2022:

- the market in air distribution and diffusion increased by 19.7%
- the air handling units and ventilation units market also increased by approximately 10%
- the industrial/tertiary ventilation market increased 17.5%
- the residential and tertiary market represent 20.3% of the total revenue in 2022 from HVAC products

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Trends in the inspection of ventilation systems



- Initial and periodic inspections
- Authorised companies or inspection entities
- Every 4 years
- Comprehensive every 15 years

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Trends in innovative systems and market

Innovative systems must demonstrate compliance with the essential requirements of CTE by **technical approval**









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Conclusions

- IAQ regulations in Spain are performance-based
- The IAQ requirement in dwellings is identified in terms of CO2 concentration
- Performance-based regulations allow the use of innovative, energy efficient systems
- The requirements may be met through simulation or deemed-to-satisfy solutions
- Ventilation market in Spain is strong and keeps increasing

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The IAQ performance-based regulation in Spain

October 2025

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Thank you for your attention

Any questions?

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