

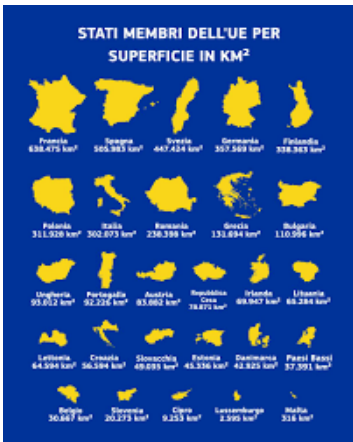
# Trends in building ventilation requirements and inspection in Italy An image of the market

## 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

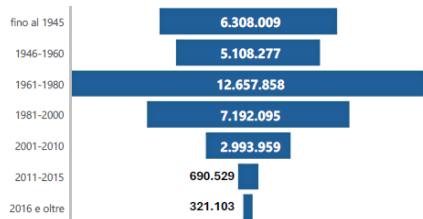
# Italy: Surface and Population



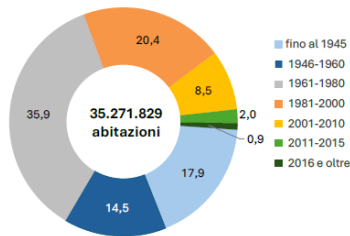
	Population (thousands)	% 0-14	% 15-64	% 65+
<b>1.1.2023</b>	58,850	12.5	63.4	24.1
<b>2050</b>				
UN	52,428	11.1	51.7	37.1
ISTAT	54,165	11.7	53.4	34.9
Eurostat	57,519	11.2	55.1	33.7
<b>2070</b>				
UN	44,455	10.9	51.8	37.4
ISTAT	47,722	11.6	54.3	34.1
Eurostat	53,333	10.9	55.5	33.6

## The Italian Building Stock

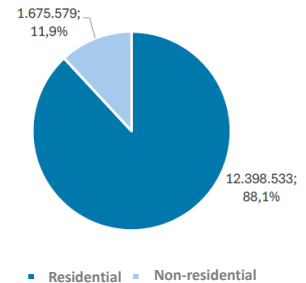
Absolute values @ 2024



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.

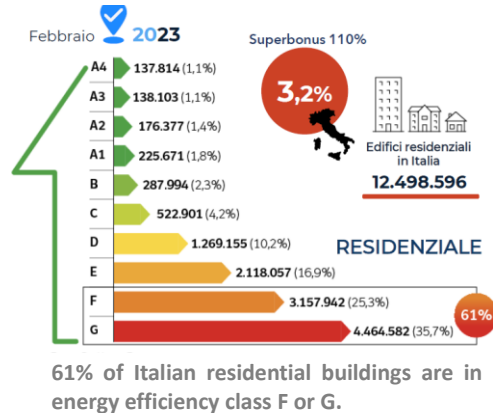
Mechanical ventilation... **not initially included** among the measures eligible for incentives...then added, but with **too low spending limits**... often overlooked... problems in renovated premises (excessive humidity... mould growth on walls and ceilings...)... compensated for by **ex-post** actions...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

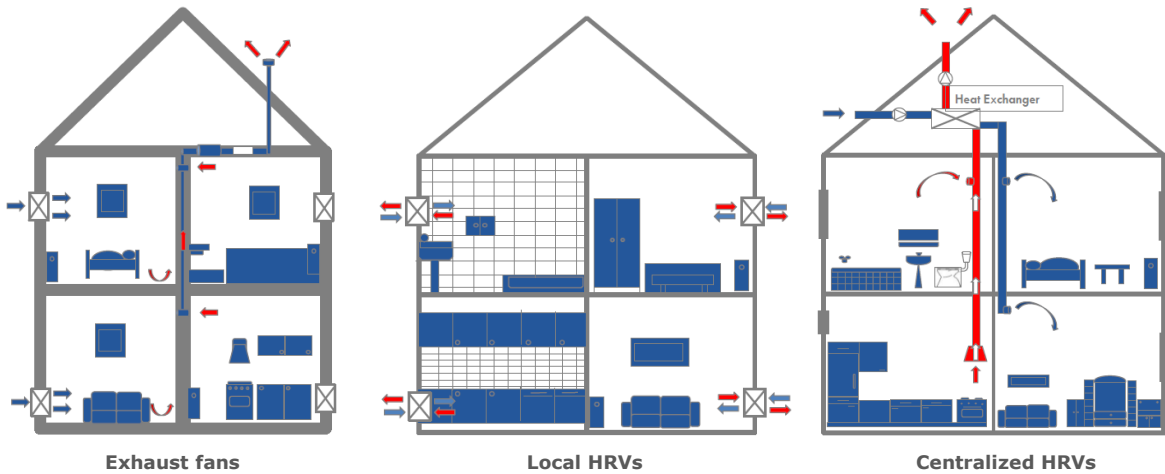
	2024	2022	2023	2024 <sup>(*)</sup>	2025 <sup>(*)</sup>
	Milioni di euro	Variazioni % in quantità			
<b>COSTRUZIONI</b>	223.467	8,9%	16,5%	-5,3%	-7,0%
<b>ABITAZIONI</b>	107.572	17,3%	14,5%	-19,8%	-25,8%
- nuove	16.406	3,3%	2,3%	-5,2%	-2,6%
- manutenzione straordinaria	91.166	20,0%	16,5%	-22,0%	-30,0%
<b>NON RESIDENZIALE PRIVATO E OPERE PUBBLICHE</b>	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

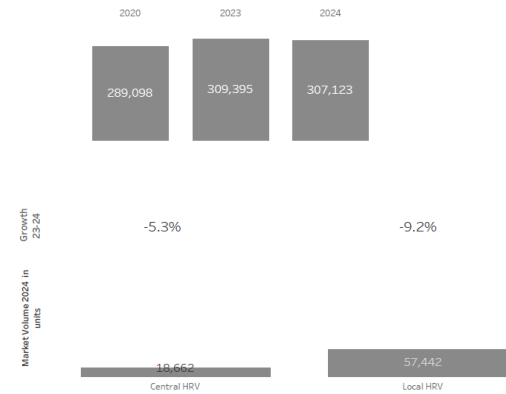
In the last decade... a **strong rise** of **local HRVs**... 10% of unit share in 2018... 20% in 2022... **declining sales** in **2023** and **2024**... mounting economic pressures.

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

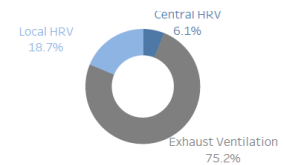
**Centralized HRVs**... mainly installed in **new buildings**...

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

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



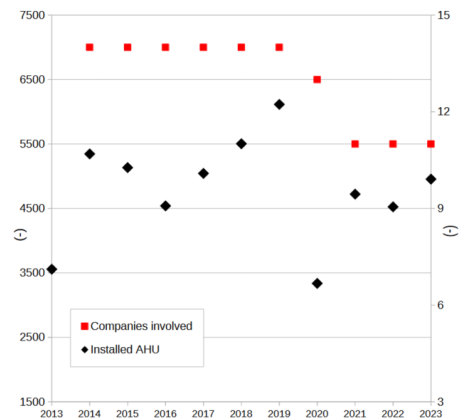
The market by product type



Source: Interconnection Consulting

## 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

## 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 1<sup>st</sup> level Renovations ( $\geq 50\%$  of the building's volume) as well as for Major 2<sup>nd</sup> 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

11

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

Thanks for your kind attention!

12



1



2

# National trends and requirements in Italy

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

**AiCARR**  
Cultura e Tecnica per Energia Uomo e Ambiente

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.

**AiCARR**  
Cultura e Tecnica per Energia Uomo e Ambiente

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 ( $\text{CO}_2$ , 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 (Decreets + UNI/TS)

- ✓ **2015 Ministerial Decreets:** 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, CO<sub>2</sub>, RH).
- ✓ No absolute whole-building energy limit; performance is relative to a national reference building.
- ✓ **Minimum electrical use for MV systems** (energy per m<sup>3</sup> moved): ~ 0.25 – 0.5 Wh·m<sup>-3</sup> depending on system type.
- ✓ **EPBD 2024/1275** (implementation pending) will tighten the energy–comfort–health linkage.



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

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<sup>-2</sup> 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



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

8



GENERATING IDEAS FOR SUSTAINABLE ENERGY



# More details...



About Events Resources Focus Fields & Projects Contact & Join



Search...

Login

HOME > RESOURCES > AIVC PUBLICATIONS > VENTILATION INFORMATION PAPERS

## Ventilation Information Papers

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.

### Volume content

Search	Author(s)	Sort by	Order	Items per page	
<input type="text"/>	<input type="text"/>	Date	Desc	20	<a href="#">Filter results</a>
<small>Enter a comma separated list of user names.</small>					

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 Fumi, Luca A. Piterà, Marco Simonetti, Michele Zinzi](#) | [PDF](#) [VIP\\_48.4.pdf](#) | [EPDF](#) [VIP\\_48\\_4\\_IT.pdf](#)

**Ventilation Information Paper n° 48.4**

**Trends in building ventilation requirements and inspection in Italy**

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

**1 General Introduction**

This information paper aims, for the first time, to provide information on ventilation needs in Italy. The analysis is based on the regulatory framework and the market evolution.

Italy exceeds for more than 2000 km<sup>2</sup> and has about 100 million inhabitants. In the country there are more than 11,5M buildings, among which more than 80% are for residential use. As of early 2025, 10% of the building stock was built before 1980, and 70% before 1970 [1]. One of the building energy performance requirements set by the Italian Building Regulations (DPR 59/13, the so-called "Energy Performance in Buildings" decree) is the achievement of a minimum energy performance class (EPC) of at least G.

The country has 20 Regions and 2 autonomous Provinces. The legislation in force in the energy sector is regulated at local level, which applies the minimum of one set of national laws and 2 large number of regional laws. Locally, some regions (especially in the north) have introduced more stringent requirements for buildings. As a result, this paper refers to the general framework, specific to the country, and to the regional requirements in force.

Historically, mechanical ventilation has not been a major concern in the country, as in other Mediterranean regions, since using solar radiation

achieved through natural ventilation, to naturally operate buildings. This approach led to developments for air conditioning systems (building typologies, such as schools, mainly public, office buildings and sport facilities). It should also be noted that the development of domestic mechanical systems is required by national laws [2-4] only for Mixed Use (residential/commercial) systems, in a representative case of rooms with a mass of operative volume to plan higher area (over 150 m<sup>2</sup>).

In the last decades, the trend has been changing rapidly: due to several factors, among energy requirements for new buildings, a move to deep building retrofits, driven by the available financial incentives, as well as both public and private initiatives that significantly increased the sustainability rate of historical or existing rooms, aimed to retro-fit existing properties.

What happens to mechanical ventilation requirements and the impact on the energy sector will be mostly observed with the current and upcoming of the national implementation regulation of the latest version of the Energy Performance of Buildings Directive (EPBD) [5].



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



GENERATING IDEAS FOR SUSTAINABLE ENERGY



# EPBD IV Towards Healthy and Decarbonised Buildings



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

CO<sub>2</sub>

Thanks for your kind attention!  
Follow us on

[aicarr.org](http://aicarr.org)  
[luca.pitera@aicarr.org](mailto:luca.pitera@aicarr.org)

 **AICARR**  
Cultura e Tecnica per Energia Uomo e Ambiente

*This document is the result of the author's free and personal interpretation. Under no circumstances may the ideas expressed by the author be considered as representing AICARR's official position. External sources (images, materials, diagrams, ideas, etc.) have been properly cited where known. Images and drawings are mostly taken from the Internet and refer to commonly shared concepts and definitions. Should any copyright have been unintentionally infringed, please contact the author of the presentation in order to resolve any possible issue.*