

EVIA response to the European Commission's Call for Evidence on the Heating and Cooling Strategy

The **European Ventilation Industry Association (EVIA)** welcomes the European Commission's forthcoming Heating and Cooling Strategy and strongly supports its ambition to make heating and cooling in Europe more efficient, sustainable, and affordable for citizens and businesses alike. EVIA particularly supports the Strategy's focus on reducing wasted energy and fostering smart integration between the heating, cooling, and power sectors.

In this context, EVIA calls on policymakers to recognise the important role that mechanical ventilation can play in achieving the objectives of the Strategy by:

- 1. Preventing energy waste and optimising energy use:** in buildings where it is fitted, mechanical ventilation minimises heat and cool losses (and the resulting energy waste) to what is strictly necessary to contribute to a good indoor air quality. Those which are not equipped with such an equipment and rely on uncontrolled window airing or natural ventilation to renew the indoor air, increase quite substantially the heating and cooling needs due to the important heat and cool losses they cause. Demand-controlled ventilation systems thus optimise the energy performance of buildings by automatically adjusting airflow to occupancy and indoor air quality levels, ensuring that no heat and cold are unnecessarily lost.
- 2. Reducing energy required for heating and cooling:** energy recovery ventilation systems retrieve heat or cool from exhaust air and transfer it to incoming fresh air. By reusing this recovered energy, they significantly reduce the need for active heating or cooling, improving the overall building's energy efficiency by lowering energy consumption and related bills.
- 3. Supporting smart integration between heating, cooling, and power systems:** smart ventilation technologies can lead to significant energy savings through larger systems implemented in non-residential buildings where opportunistic smart grid integration can support demand-side flexibility, thus contributing to electricity grid stability.

These energy savings directly translate into greater affordability for households, reducing energy poverty risks and enhancing resilience for vulnerable consumers sheltering them from price increases. At the same time, mechanical ventilation plays a key role in ensuring healthy and comfortable indoor environments. Several [recent studies](#) indicate that the air inside our homes can be up to 10 times more polluted than outdoor air¹. This is because human activities and elements inside buildings emit pollutants such as volatile organic compounds and particulate matter². Mechanical ventilation improves indoor air quality (IAQ) by filtering incoming air and preventing outdoor particulate matter from entering buildings. This is especially relevant as people spend around 90% of their time indoors, and according to the [World Health Organization](#), 154,000 Europeans die prematurely each year due to poor IAQ – a societal cost estimated at €325 billion annually.

Mechanical ventilation prevents energy waste and thus optimizes energy use

In new or refurbished buildings, which are well insulated, approximately 50% of the energy demand, and even a higher rate in non-residential buildings, can stem from heat and cool losses due to air renewal

¹ [Sources de pollution de l'air intérieur.](#)

² Human activities (e.g. cooking, cleaning) and building materials (e.g. paints, furniture, flooring) release pollutants such as volatile organic compounds such as formaldehyde and benzene, radon, carbon monoxide, ultrafine particulates and fine particulate matter.

through both window airing and non-state of the art or non-properly operating ventilation system depending on the use of the building³.

In France, for example, in the residential sector, air replacement losses account for an average of 20 to 25%⁴ of heating needs of an average building. This energy waste can be dramatically reduced thanks to the implementation of a modern and well-functioning dedicated mechanical ventilation system. Yet, only around 30%⁵ of the housing stock is currently equipped with efficient systems optimising air renewal. According to the French Tremi 2020 study, mechanical ventilation is the most cost-effective energy-saving measure, delivering 6.66 kWh of energy savings per euro invested – around three times more than most other renovation actions and ranking second for CO₂ reduction potential. Across the French housing stock, upgrading to high-performance mechanical ventilation dwellings which are not fitted with such systems could deliver 41 TWh of final energy savings per year, reduce emissions by 6.9 Mt CO₂, and generate €6 billion in financial gains annually.⁶

A similar potential exists in the non-residential sector. Here too, air renewal represents a major source of energy loss – around 25% of total heating energy consumption in average French non-residential buildings, equivalent to 58 TWh per year and costing building owners approximately €6.9 billion annually. Most of these buildings still rely on inefficient or uncontrolled ventilation systems as well as window airing. Upgrading to high-performance mechanical ventilation could yield 21 TWh of final energy savings annually, reduce emissions by 3.5 Mt CO₂, and generate over €1.1 billion in annual financial savings for building owners and operators.⁷

Demand-controlled ventilation (DCV) systems automatically adjust ventilation rates to actual occupancy and IAQ needs. This ensures that the air is renewed only when and where necessary, preventing unnecessary heating and cooling needs. The electricity used for fan operation is also optimised, further lowering consumption. In practice, simple DCV systems can reduce a building's energy needs by 15–26%⁸ compared to buildings not fitted with such systems.

Energy recovery ventilation systems significantly reduce the energy required for heating and cooling

In addition, energy recovery ventilation (ERVs) systems significantly reduce the energy consumption required for heating and cooling buildings, by recovering the heat and cold from indoor air. For example, a system with a 90% energy exchanger efficiency can, assuming an indoor air temperature of 20°C and outdoor air of 0°C, preheat passively the incoming air to 18°C without requiring additional energy. The building's heating system would then only need to raise the air temperature by 2°C instead of 20°C, demonstrating the remarkable energy-saving potential of mechanical ventilation with energy recovery.

³ [Hamburgisches Weltwirtschaftsinstitut & Shell Deutschland: Shell Hauswärmestudie](#)

⁴ [ADEME Guide - How to insulate your home?](#) and [ADEME Guide - How to spend a comfortable winter?](#)

⁵ [Uniclimate statistics](#).

⁶ Tremi 2020 study, sponsored by the French Ministry for the Ecological Transition - [Renovating homes for energy efficiency](#) and [reducing GHG emissions from renovations](#). The study quantifies the conventional reductions in energy consumption and GHG emissions generated by specific renovation works carried out between 2017 and 2019 in single-family homes.

⁷ Estimates are based on data from [CEREN, DataLab \(Key Energy Figures 2024\)](#), and the [French Ministry of Ecological Transition's GHG inventory for the non-residential sector](#), combined with ventilation distribution data from ADEME's [Air.h study](#), the [Energy Performance Certificates \(DPE\) observatory](#). Energy consumption and air renewal costs were calculated using the methodology in [CEE BAT-TH-125, -126](#), which estimates energy consumption and air renewal costs for each French climate zone H1 (cold), H2 (moderate) and H3 (warm).

⁸ Calculated according to the French administration's energy saving certificate scheme - relative to humidity demand control ventilation BAR-TH-127.

Despite this potential, fewer than 5%⁹ of EU buildings currently use ERVs, revealing a vast untapped opportunity. By recovering what is otherwise wasted, ERV systems can avoid large thermal losses and significantly reduce heating and cooling demand. Typically, 1 kWh of consumed electricity results in a saving of 4 to 10 kWh of thermal energy depending on climate and use¹⁰. As a result, ERV systems can boost building energy performance and reduce heating costs by up to 30%, while also lowering cooling needs.

Furthermore, the combination of energy recovery ventilation with heat pumps offers a highly efficient and sustainable solution. Systems where bidirectional ventilation units (BVUs) with energy recovery ventilators are combined with air-to-air heat pumps deliver exceptional performance, for both heating and cooling. In these integrated setups, the ventilation component plays a central role in improving the overall system efficiency. The energy recovery between airflows captures and reuses energy that is otherwise wasted, reducing the need for active heating or cooling and cutting overall energy needs. In buildings whose energy needs have been optimised, heating and cooling them using the air vector is a very efficient and economic mean to do so. The deployment of this kind of solution, used in particular for non-residential buildings, should thus be favoured.

Despite these clear efficiency benefits, the energy recovered through mechanical ventilation is not currently recognised within the EU's energy framework. In the Renewable Energy Directive (RED III) the definition of waste heat and cold focuses mainly on by-products from industrial or power generation processes that feed into district heating and cooling systems. This narrow scope overlooks the vast potential of heat and cold recovered at building level through mechanical ventilation systems. Broadening the definition to explicitly include the recovery of energy from indoor air in buildings would ensure that the contribution of mechanical ventilation systems is properly accounted for and incentivised in the EU's heating and cooling decarbonisation efforts.

Smart ventilation enables energy savings and grid flexibility in non-residential buildings

In non-residential buildings, ventilation needs are significantly higher than in homes due to larger spaces and higher occupancy levels. This makes smart ventilation systems – combining sensors, demand-controlled airflow and energy recovery – a powerful tool to improve both energy efficiency and system smartness. By continuously adjusting air exchange rates to actual occupancy and IAQ conditions, smart ventilation can typically reduce outdoor air volumes by 20–60%, leading to annual electricity savings of more than 40%¹¹.

In addition to efficiency gains, smart ventilation can support grid stability. Non-residential buildings represent concentrated, high-energy systems that can be leveraged within the Smart Grid without IAQ. Ventilation systems adjust their loads in real time, enabling high-energy-use buildings to play a more proactive role in overall energy management. The HVAC industry already applies energy-saving strategies in association with Building Management Systems, contributing to grid stability by reducing electricity needs.

EVIA's recommendations:

To fully unlock this potential, EVIA calls on the European Commission to ensure that the forthcoming Heating and Cooling Strategy:

⁹ [Review study on the Ecodesign and Energy Regulations on ventilation units ENTR Lot 6 \(2020\)](#): Phase 1.1 and phase 1.2, Final Report, Task 2 Markets, fig. 2 Residential and fig. 3 Non-residential

¹⁰ Claus Händel, [CLIMA 2019](#), Heat recovery in ventilation systems - waste heat use or renewable energy, Congress - Proceedings of a meeting held 26-29 May 2019, Bucharest, Romania E3S Web of Conferences Volume 111 (2019)

¹¹ EVIA Smart Ventilation whitepaper.

- **Addresses wasted energy through ventilation** by recognising that mechanical ventilation is not a passive energy consumer, but an active enabler of buildings' energy efficiency, optimising energy use by preventing its avoidable loss, ensuring that the heat and cold is, to a great extent, effectively retained within buildings. Unlike window airing and natural ventilation, it renews the indoor air in a controlled way to the level which is strictly needed for an adequate IAQ.
- **Looks beyond traditional waste heat reuse examples.** Energy recovery ventilation systems capture and reuse heat or cold from exhaust air, reducing the need for active heating or cooling and lowering overall energy demand. Recognising this potential would help unlock cost-effective energy savings at building level.
- **Ensures that the contribution of mechanical ventilation to energy recovery is properly recognised and accounted for, by updating the definition of waste heat and cold in the Renewable Energy Directive.** This definition should explicitly include in its remit the recovery of energy from indoor air in both residential and non-residential buildings.
- **Supports the wider deployment of integrated air-based heating and cooling systems,** particularly in the non-residential sector. In optimised buildings where energy needs have been minimised through proper insulation and efficient ventilation, using air as the energy transfer vector (for example through stand-alone ventilation systems or those combined with air-to-air heat pumps) provides a highly efficient and cost-effective solution.
- **Ensures coherence with the recast Energy Performance of Buildings Directive (EPBD),** by recognising that mechanical ventilation supports both initiatives' objectives: it contributes to the energy efficiency gains to be achieved under the EPBD and reduces energy waste in line with the goals of the Heating and Cooling Strategy. As buildings become more airtight and heating and cooling systems more efficient and decarbonised, mechanical ventilation is essential to maintain healthy indoor environments and ensure the effective use of energy.
- **Encourages smart integration of ventilation** within buildings, recognising its role in reducing energy needs and contributing to grid stability by optimising the energy used by buildings.

Decarbonising heating and cooling, Europe's largest energy-consuming sector, is essential to meet the EU's climate and energy goals. By fully integrating mechanical ventilation into the Heating and Cooling Strategy, the EU has at its disposal a tool to help it deliver on its objectives to improve the efficiency of heating and cooling systems, reducing significantly wasted energy and delivering healthier and comfortable living environments for its citizens.

About EVIA

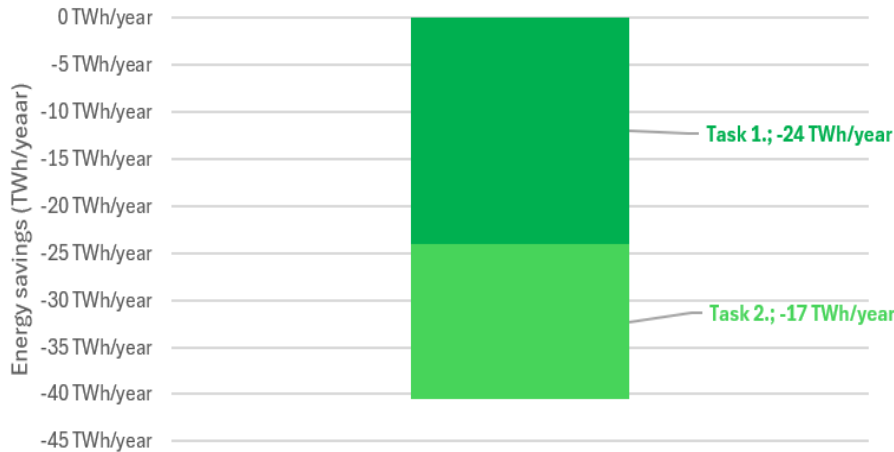
The European Ventilation Industry Association (EVIA) represents the interests of 39 European mechanical ventilation manufacturers and six national associations across Europe, realising an annual turnover of over EUR 7 billion and employing more than 45,000 people.

EVIA aims to promote the implementation of highly energy efficient mechanical ventilation applications across Europe, with high consideration for health and comfort aspects. With Europeans spending 90% of their life indoors, good indoor air quality is a critical element of health that should not be overlooked.

Annex: The French context

Equipping homes with an efficient mechanical ventilation system could save individuals more than €6 billion of energy costs a year, and can be done in 2 complimentary ways with considerable benefits:

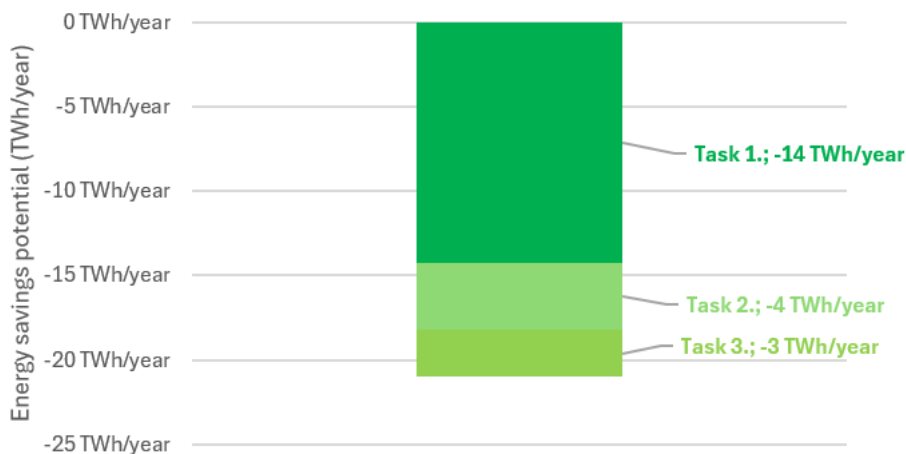
Résidentiel : Potential energy savings (TWh/year) linked to efficient mechanical ventilation



- Task 1. Equip homes, which are not fitted with a mechanical air renewal system, with such a device like demand control UVU or BVU with energy recovery: savings of 24 TWh/year and €3.2 billion of energy costs for individuals, as well as a reduction in emissions of 4.1 MteqCO₂.
- Task 2. Replace old-generation constant flow UVUs with high-performance systems, demand control UVU or BVU with energy recovery: savings of 17 TWh/year and €2.8 billion of energy costs for individuals, as well as a reduction in emissions of 2.8 MteqCO₂.

Equipping non-residential buildings with an efficient ventilation system, modulating flow rates or recovering energy, could save their owners/operators more than 1.1 billion euros a year, and can be implemented in 3 ways, each offering considerable benefits:

Non-residential : Energy savings potential (TWh/year) linked to high-performance mechanical ventilation systems



- Task 1. Install high-performance mechanical ventilation systems in schools, offices and retail outlets, which currently rely mainly on airing means: savings of 14 TWh/year, lower emissions of 2.4 MteqCO₂ and energy bills by 550 million euros for owners/operators.

- Task 2. Replace energy-intensive constant flow UVU systems with high-performance mechanical ventilation systems: savings of 4 TWh/year, lower emissions of 0.7 MteqCO₂ and decrease energy bills by 328 million euros for owners/operators.
- Task 3. Replace energy-intensive non-ducted constant flow ventilation units with ducted high-performance mechanical ventilation systems: savings of 3 TWh/year, lower emissions of 0.5 MteqCO₂ and reduce energy bills by 264 million euros for owners/operators.

The TREMI 2020 Study on renovating homes for energy efficiency and on reducing GHG emissions from renovations and sponsored by the French Ministry for the Ecological Transition, quantifies the conventional reductions in energy consumption and GHG emissions generated by specific renovation works carried out between 2017 and 2019 in single-family homes. It concludes that:

1. Implementing mechanical ventilation is by far the most cost-effective energy saving measure in home renovation.
2. In terms of greenhouse gas emission reduction, fitting mechanical ventilation is the second most advantageous type of work.

Work gesture	Energy saving (kWhEP/year) / cost (€ inc VAT supplied & installed)
Replacement or installation of a mechanical ventilation system	6,66
Replacement or installation of a heat production system	2,13
Insulation of hot water and domestic hot water systems	1,63
Insulation of attic floor	1,61
Improvement of heating monitoring	1,43
Insulation of walls from the inside	1,33
Insulation of low floor	1,15
Replacement of external doors	0,91
Insulation of walls from the outside	0,79
Installation of shutters	0,73
Replacement of domestic hot water system	0,58
Insulation of flat roof	0,46
Insulation of attic roof from the inside	0,35
Replacement of windows	0,34
Installation of electric heating system	0,26

Work gesture	Carbon saving (kgeqCO ₂ /year) / cost of project (€ inc VAT supplied & installed)
Replacement or installation of a production system	0,80
Replacement or installation of a mechanical ventilation system	0,74
Installation of electric heating	0,42
Insulation of the attic floor	0,22
Insulation of the walls from the inside	0,19
Insulation of the lower floor	0,17
Insulation of the hot water and domestic hot water networks	0,15
Insulation of the walls from the outside	0,12
Replacement of the domestic hot water system	0,07
Insulation of the flat roof	0,06
Insulation of the attic roof from the inside	0,05
Improvement of heating monitoring	0,04
Replacement of windows	0,03
Replacement of external doors	0,01
Installation of shutters	0,01