EVIA Key Recommendations for the European Affordable Housing Plan

Right to adequate ventilation and healthy indoor air to deliver decent and affordable housing

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.

For this reason, **EVIA calls on the European Commission and the European Parliament to enshrine the right to adequate ventilation and healthy indoor air for Europeans in the upcoming European Affordable Housing Plan**.

THE RIGHT TO HEALTHY AIR DOES NOT STOP AT YOUR FRONT DOOR

EVIA calls on EU decision-makers to introduce the following elements in the European Affordable Housing Plan:

Include healthy indoor air quality, through adequate ventilation, as an essential aspect of decent housing. Ventilation, enabling to optimise the energy needs of dwellings, will also improve their sustainability and affordability dimensions. This can be achieved specifically through the transposition of the EPBD's IAQ and ventilation requirements. Their correct implementation should be monitored and reported on.

Integrate IAQ monitoring systems in residential buildings, particularly for new constructions and major renovations, and incentivise the installation of mechanical ventilation, at least for social housing.

Support projects that gather data on IAQ in various housing contexts to inform policy and best practices, starting with the draft implementing act on templates for sending information to the EU Building Stock Observatory, which should mandate the transfer of IAQ and ventilation-related information[1].

Finance information initiatives by Member States to educate residents on IAQ, proper ventilation and risks associated with an inadequate indoor environment.

This would allow to find the right balance between:

1. Ensuring European citizens are breathing healthy air inside their homes while reducing financial burdens in the long term.
2. Improving the sustainability and durability of European buildings in a cost-efficient way.
3. Maintaining climate ambition while strengthening the housing sector.

Read our Joint Manifesto for more information.

[1] For more information, we invite you to read EVIA's contribution to the recent public consultation on the EU BSO.

Key facts: the role of mechanical ventilation for affordable, sustainable and decent housing

➔ In new or refurbished buildings, which are well insulated, approximately 50% of the energy demand can stem from thermal losses due to air renewal through both window airing and natural ventilation, depending on the use of the building[2]. **This energy waste can be dramatically reduced thanks to the implementation of a modern and well-functioning dedicated mechanical (1) demand-control and/or (2) energy recovery ventilation system to replace indoor air.** Thus, the use of an energy recovery equipment brings the benefit of a reduced building 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 use[3].** Statistically, **less than 5%[4] of buildings in the EU are equipped with ventilation energy recovery systems**, therefore the room for improvement is substantial.

Moreover, **demand-control mechanical ventilation systems**, by adapting air replacement needs to what is strictly necessary to keep air pollutants at levels sufficiently low, **reduce residential building's energy needs by 15-26%**[5] compared to buildings which are not fitted with such devices. These two types of mechanical ventilation technologies should therefore be promoted as they can significatively help moderate the impact of high energy prices and alleviate the effects of energy poverty while significantly contributing to a healthy indoor air quality.

➔ Several recent studies indicate that **the air inside our homes can be up to 10 times more polluted than outdoor air[6].** This is because human activities and elements inside residential buildings emit pollutants such as volatile organic compounds and particulate matter.

➔ In addition, everyday activities like cooking and bathing, as well as insufficient heating, promote a high level of humidity, with the average family generating around **10 litres of moisture per day[7]**. If not controlled with a mechanical ventilation system, this can lead to mould growth, toxic spores, and dust mites, favouring the development of respiratory diseases by occupants and contributing to building decay. In turn, this necessitates to renovate buildings at a much higher frequency rate entailing costs which could be avoided.

➔ The WHO estimates that **150,000 Europeans die prematurely every year due to poor IAQ**, translating into an annual cost to society of approximately EUR 325 billion. Although IAQ is often overlooked, it has a direct effect on respiratory conditions, physical and mental health, and overall quality of life.

➔ IAQ is a real public health issue. In France alone, ANSES, OQAI and CSTB have estimated that, in France, the annual **socio-economic cost** of indoor air pollutants is close to **EUR 19 billion**[8].

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[2] Hamburgisches Weltwirtschaftsinstitut & Shell Deutschland: Shell Hauswärmestudie
[3] 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)
[4] 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
[5] Calculated according to the French administration's energy saving certificate scheme - relative to humidity demand control ventilation BAR-TH-127.
[6] Sources de pollution de l'air intérieur
[7] Typical moisture production for a family of four (kg/day) | Download Scientific Diagram
[8] ANSES - Exploratory study of the socio-economic cost of indoor air pollutants

EU policy alignment for healthy and energy-efficient housing

The EU is at a pivotal moment for the building/housing sector, with the first-ever European Affordable Housing Plan expected for 2026. The Plan is due to address structural drivers for affordable, decent and sustainable housing, tackling complex challenges from a social, health, industrial and sustainability perspective. At the same time, the EU is moving to guide Member States in implementing the Energy Performance of Buildings Directive (EPBD), which will drive innovation, decarbonisation and job creation in the European Union for a key sector of the economy.

Following a recent revision, the EPBD recast requires Member States to set requirements for the implementation of adequate indoor environmental quality (IEQ) standards in buildings and mandates ventilation system inspections, with the aim to improve indoor climate and buildings' energy efficiency and durability. Moreover, in July 2024 the European Commission published a Staff Working Document on supporting Indoor Air Quality to improve the way in which Member States take indoor air quality into account, highlighting its social relevance in ensuring a healthy and comfortable living environment for Europeans.

EVIA calls on the European Commission and the European Parliament to fully take stock of these elements into the upcoming European Affordable Housing Plan, **ensuring policy alignment between the Plan and the EPBD**, and **reaffirming the need for sufficiently ambitious IAQ and ventilation requirements in the frame of the transposition process for healthier and more energy-efficient dwellings**.

More specifically, EVIA calls on EU institutions to consider the following contributions of mechanical ventilation systems towards the achievement of decent, sustainable and affordable housing:

Sustainable housing

Energy-efficient mechanical ventilation systems fitted in buildings significantly reduce their energy needs compared to dwellings relying on window airing and natural ventilation. This is because mechanical ventilation allows maintaining healthy IAQ while controlling/adjusting air flows which are strictly necessary for that. Allowing to avoid important thermal losses resulting from the use of uncontrolled means to replace indoor air, it enables consequently to lower the energy consumption and carbon footprint of this type of building. Moreover, mechanical ventilation supports higher durability in buildings and prevents structural degradation (e.g., mould), which is an important benefit regarding savings in the long run as it reduces the need for renovations and therefore additional expenses.

Affordable housing

Lowering energy consumption of buildings translates into reduced costs for residents, supporting affordability in both new and existing renovated buildings. It consists in an efficient means to reduce the impact of energy price increases on households and to fight energy poverty.

Decent housing

While IAQ is often overlooked, it has direct effect on respiratory conditions of occupants, their physical and mental health and, overall, their quality of life. It should therefore be an essential element to consider when labelling housing as "decent". Mechanical ventilation systems are the most effective solution to maintain a healthy indoor environment while optimising the energy consumption of buildings and preventing structural degradation, which is essential to keep the dwelling in a state fit for living. Moreover, due to the growing frequency of extreme weather events, such as heat waves, it is more important than ever to equip homes with mechanical ventilation systems, which allow to maintain an appropriate temperature without compromising indoor air quality.

Maintaining a good IAQ in an energy efficient way

Indoor air quality (IAQ) is a term which refers to the air quality within buildings and enclosed spaces, especially relating to the health of building occupants. Ensuring a good IAQ in residential buildings, such as houses and apartments, is crucial for the wellbeing of people in their homes. Indoor air pollutants include Volatile Organic Compounds (VOCs), Particulate Matter (PM) and viruses, but relative humidity also needs to be kept in an appropriate range to avoid an air too humid or too dry which is detrimental to people's health.

Everyday activities like cooking and bathing, as well as insufficient heating, promote a high level of humidity, with the average family of four generating around 10 litres of moisture per day[9]. This can lead to mould growth, the spread of toxic spores and dust mites with adverse impacts on building occupants. Over time, this also contribute to building decay, costly repairs, and decreased property value, which could easily be avoided.

Many people open windows to renew indoor air, but this results in significant energy losses (hot air in the winter and cool air in the summer), especially during increasingly common extreme weather events, and rapidly declining IAQ once they are closed. Moreover, many situations linked to security, acoustic, outside pollution, and often just capability, do not allow to make use of them. The most effective solution to renew indoor air and maintain a good IAQ while minimizing energy losses is controlled mechanical ventilation.

Mechanical ventilation as a solution

Mechanical ventilation systems involve the use of fans and ducts to circulate and exchange air, ensuring an adequate flow of incoming fresh air in the least polluted rooms, while stale air is expelled outside of the building from the most polluted ones. There are different types of ventilation systems: heat recovery ones minimize heat loss in winter and cool loss in summer, while demand-controlled systems adjust air renewal rates based on occupancy and air quality, optimizing energy use. Both systems can also be combined.

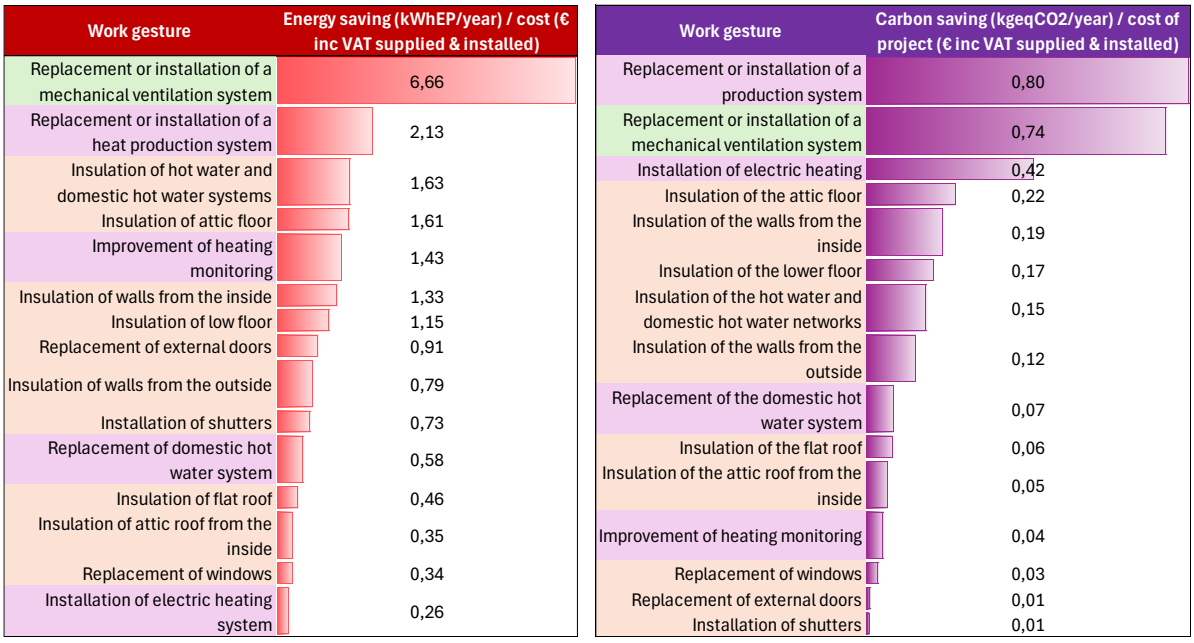
An ideal energy-efficient home is airtight thanks to appropriate insulation, with a mechanical ventilation system renewing the air in a controlled way, thereby contributing to ensuring a good indoor air quality, keeping occupants healthy and buildings in good shape while reducing energy consumption to what is strictly necessary.

[9] Typical moisture production for a family of four (kg/day) | Download Scientific Diagram

Annex: The French context

In the residential sector, **air replacement losses account for an average of 20 to 25%[10] of the heating needs. A large proportion of this figure is due to the use of energy-inefficient air replacement systems in buildings.** In fact, only 30%[11] of the existing housing stock is equipped with a mechanical ventilation system that optimizes energy requirements, such as UVUs with relative humidity sensors integrated into air inlets and outlets in each room or BVUs with energy recovery. In fact, both technologies reduce heat losses to what is strictly necessary to contribute to adequate IAQ.

The Tremi study 2020[12] highlights that **mechanical ventilation is by far the most cost-effective energy-saving measure** in home renovation**. In terms of greenhouse gas emissions, it is also the second most advantageous.** Conducted by ADEME and SDES, this survey quantifies the conventional reductions in energy consumption and greenhouse gas emissions generated by renovation work carried out between 2017 and 2019 in single-family homes.



The method presented in the French Energy Savings Certificates (CEE) calculation sheets BAR-TH-125, -127, -155, BAT-TH-125 and -126 reveals a significant potential for energy savings, as detailed in Appendix 1 and Appendix 2:

Renovate with high-performance mechanical ventilation systems	**Energy savings potential** (TWh_{FE}/year)	**Decarbonation potential** ($MteqCO_2$/year)	**Potential financial gains** (€ billion/year)
Housing stock	41	6,9	6

CEE data sheets currently only deal with energy consumption during the heating period of buildings. However, high-performance mechanical ventilation also makes it possible to optimize energy consumption for cooling during the summer period. The potential energy savings and decarbonization associated with the use phase presented above are therefore underestimated in relation to all the energy uses of the building stock.

[10] ADEME Guide - How to insulate your home? and ADEME Guide - How to spend a comfortable winter?
[11] Uniclima statistics
[12] Tremi 2020 study - Renovating homes for energy efficiency and reducing GHG emissions from renovations

Estimating the decarbonation potential of mechanical ventilation in the housing stock

1. Calculation assumptions

According to INSEE data[13], on 1 January 2024, France had around 30 573 000 principal residences, or 2.9 billion m^2 of heated floor space, consuming 423.5 TWh/year of heating energy[14], emitting 58 MtéqCO_2[15]. Also according to INSEE[16], 58% of primary residences are located in climatic zones H1 [17], 30% in H2 and 12% in H3. 37%[18] of residential buildings are heated by electricity and 63% by fossil fuels (gas, oil, wood, etc.).

In 2024, end consumers paid an average of €0.25160/kWh[19] for electricity and €0.11237/kWh[20] for fossil fuels.

ADEME's Energy Performance Certificates (DPE) observatory[21] provides an approximate breakdown of air renewal systems in existing homes:

- Airing: 17
- Natural ventilation through common duct: 9%
- Natural ventilation with top and bottom grilles: 6%
- Constant air flow UVUs: 33%
- Gas-fired UVUs: 1%
- Old-generation mechanical ventilation on common existing ductwork: 3%
- UVUs with HR sensors integrated into air outlets: 12%
- UVUs with HR sensors integrated into air inlets and outlets: 16%
- BVUs: 3%

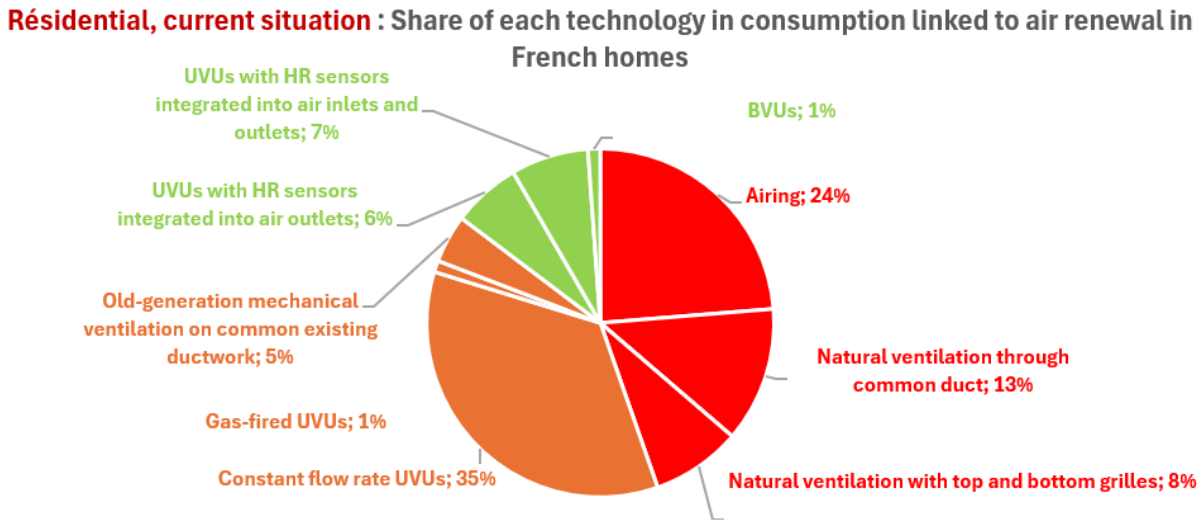
The calculation methodology used in CEE sheets BAR-TH-125, -127, -155[22], enables us to estimate the energy consumption[23] linked to air renewal and the associated costs for each French climate zone H1 (cold), H2 (moderate) and H3 (warm).

2. Estimated consumption of air renewal systems for existing homes

73 TWh/year of energy consumption is caused by air renewal in homes, representing over 17% of total heating consumption in French homes.

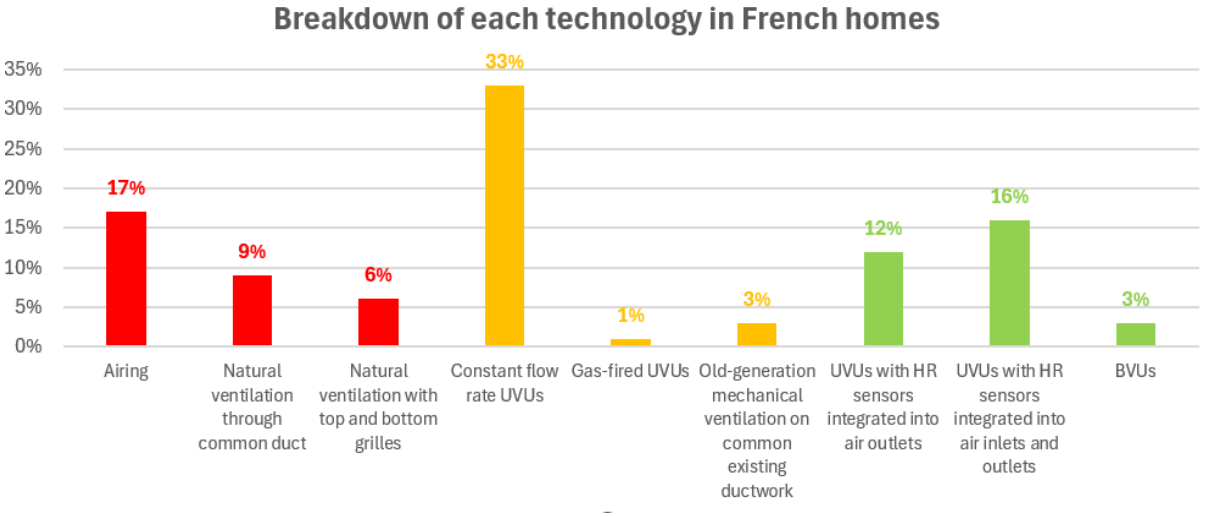
The proportion of French homes with an air renewal system that does not control the air flow or is energy-intensive is up to 69% and relates to 21 million homes.

[13] INSEE - Housing stock on January 1, 2024
[14] DataLab - Key energy figures (2024 edition)
[15] Notre-environnement.gouv.fr - Greenhouse gas emissions from the residential sector
[16] INSEE - Census of principal residences
[17] Ecologie.gouv.fr - Listing of climate zones
[18] Sustainable development statistics - Energy consumption in housing
[19] Electricité.com - Electricity kWh prices
[20] CRE - Natural gas price per kWh
[21] ADEME - Energy Performance Certificates (DPE) Observatory
[22] ATEE - CEE data sheet BAR-TH-125, -127 or -155
[23] SDES - Unified Degree Days (UDD) for each climate zone



Aired homes (through windows) and those equipped with natural ventilation systems that do not control airflow rates are responsible for over 45% of air renewal consumption in French homes. In addition, over 40% of air renewal consumption is attributable to constant airflow rate UVU systems, which do not adapt air renewal to the actual needs of the dwelling. One third of French homes are equipped with an energy-efficient mechanical ventilation system, such as UVUs with HR sensors integrated into air inlets and outlets or BVUs. Thanks to these efficient technologies, this third accounts for less than 15% of the total consumption linked to air renewal in all homes.

The French spend around €11.7 billion on heating to renew the air in their homes.

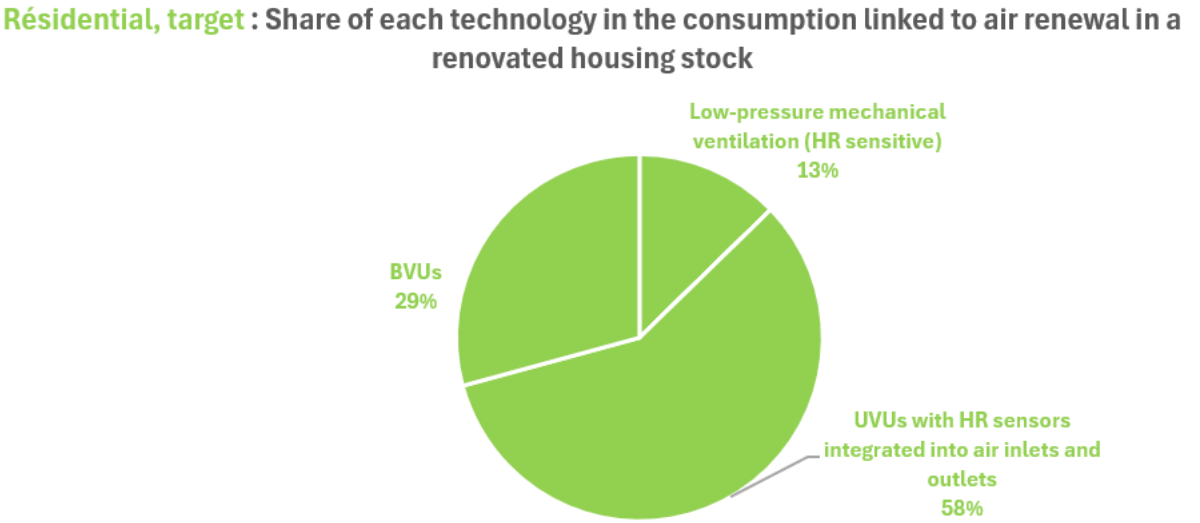


An aired home (through windows) or one equipped with natural ventilation costs an average of more than €5/m^2 in heating needs. A constant airflow rate UVU systems costs around €4/m^2 of floor space. 80% of this figure corresponds for heating losses, and 20% for fan operation. An efficient mechanical ventilation system, such as UVUs with HR sensors integrated into air inlets and outlets or BVUs, costs the household only around €2/m^2 in heating costs.

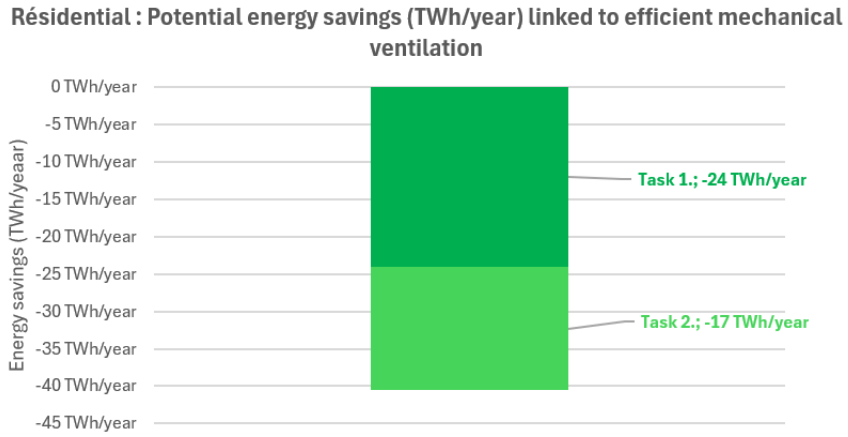
3. Estimated consumption of air renewal systems for renovated housing stock

Treating buildings with not controlled or energy-intensive air renewal by installing an efficient mechanical ventilation system has an energy-saving potential of 41 TWh$_{\text{Final Energy}}$/year, and a reduction of 6.9 MteqCO$_2$/year. This would reduce heat loss through air exchange by more than 50% compared with the current state of the stock. This energy saving is equivalent to 1.3 times the 2023 output of French fossil

fuel power plants[24]. It is also equivalent to supplying electricity to 3 million households for one year[25] **and to the annual electricity production of 7 nuclear reactors**. It is also equivalent to the consumption of 285,000 gasoline-powered cars travelling 250,000 km (their average lifetime[26]), or 85 million full tanks of fuel with a global warming potential of 6.7 MtéqCO_2[27].



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



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 for individuals, as well as a reduction in emissions of 4.1 MteqCO_2.

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 for individuals, as well as a reduction in emissions of 2.8 MteqCO_2.

[24] Senat report - Lighting up the future: electricity in 2035 and 2050
[25] EDF - French nuclear energy in figures
[26] ADEME - Average fuel consumption of new vehicles
[27] Sustainable development statistics - CO2 emissions from new light vehicles