

Key trends in HVAC sector and the role of AiCARR: insights on the next Mostra Convegno Expocomfort



The point of view of
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Which are the key topics of the 2022 edition of MCE (28th June - 1st July 2022)?

In recent years, Italy has resorted to various measures with the scope of achieving environmental protection, energy security and affordability to reach the European Union (EU) targets in the field of Energy and Environment. Among other things, considering the environment as the economic engine of the country, Italy shared the orientation aimed at strengthening the commitment to the decarbonisation of the economy and at supporting the New Green Deal among businesses and citizens. Last July, these efforts were further stressed by the adoption at community level of a series of proposals, known as the “Fit for 55” package, which intended to accelerate the definition of EU policies on climate, energy, transport, and financial support, with the final goal of reducing the net greenhouse gas emissions of at least 55% by 2030, compared to 1990 levels. Based on the above, concerning the 2022 edition of *Mostra Convegno Expocomfort* (MCE), which has been postponed next summer (28th June – 1st July 2022), AiCARR decided to propose in the next months, as an accompanying path to MCE, three half-day seminars on the following topics: “Indoor air quality issues for future buildings”, “Decarbonisation and energy carriers: a new roadmap for 2050” and “Technological innovation for sustainable refrigeration equipment”.

Furthermore, AiCARR is considering the possibility of holding the next National Conference, entitled “Buildings and HVAC systems for future climate” at the Mostra Convegno Expocomfort.

How has COVID-19 influenced these topics? And what are the main insights emerging from the COVID-19 pandemic emergency?

The current COVID-19 pandemic has highlighted how ventilation (i.e., introduction of outdoor air in confined environments) is a fundamental therapy for the prevention and reduction of the risk of airborne infection, including also the “normal” seasonal flu. Therefore, the COVID-19 emergency contributed to reinforce the need of proper systems able to guarantee and maintain good indoor air quality (IAQ) conditions in confined spaces, which was previously intended as a sole perception rather than a physiological need. These considerations open to a new vision on the future role of ventilation and especially of mechanical ventilation in buildings, which has been already exploited to combine IAQ requirements with those of energy consumptions reductions.

In all shared environments with many people, from offices to schools, from theatres to gyms, from sports halls to worship places, as well as in public transportation, ventilation should become an obligation, no longer remaining an optional plus. At the same time, it is necessary to ensure a comfortable environment for occupants since thermo-hygrometric well-being is not only a “whim” but has direct implications both on health (just think of the carriers of cardiopathic diseases) and on occupants’ productivity. Consequently, all buildings not exclusively intended for residential use should mandatorily install mechanical ventilation systems, since natural ventilation is not sufficient

enough to ensure the required outdoor air quantity and quality and to effectively filter any dust or pollutants present in the outside air. Meanwhile, such systems must respond to the need of containing energy consumption and of decarbonising the building stock.

In recent years, the pandemic has increased people awareness on environmental issues, as well as on the importance of living in secure and healthy spaces. Driven by a new paradigm, built around the main priorities of health, well-being, energy savings and environmental sustainability, it is necessary to rethink the design of buildings systems, to sustainably balance these needs. A change in how the building-plant system is designed is needed, to improve its energy performance and security, also guaranteeing a reduction of energy management costs. To this purpose, five strategies can be defined: ventilation efficiency (meaning the optimization and control of air diffusion in indoor spaces, especially in variable flow systems); sealing of aeraulic networks; adoption of selective systems for the abatement of specific contaminants; heat recovery systems; and free-cooling.

What do you think about the role of HVAC systems in the ecological transition promoted by Italy and Europe?

According to the latest energy efficiency report from ENEA (2021), in 2019, Italian final energy consumption reduced by 1.1% compared to the previous year, attesting to about 120 Mtoe in the last 3 years. The building sector remains the most energy-intensive sector, consuming 41.1% of total final energy (the sector has experienced a 44% increment of final energy consumptions from 1990 to 2019, corresponding to an average +1.3% annual increase), followed by transport (29.8%) and industry (20.7%) sectors, both characterized by a decreasing trend in the last years. Given the above, if we want to achieve the decarbonisation objectives at both European and Italian level, the building sector is in the spotlight and the greatest challenge lies in the renovation of the existing building stock, with a particular attention on existing historical heritage.

HVAC&R systems play a fundamental role in the building transition, especially in this last period, characterized by a strong attention on their capacity of guaranteeing healthier indoor conditions. To support this, there is the need to develop a holistic design approach for energy systems and buildings, having ventilation as their core element and adopting all the technical and technological arrangements able

to minimize their energy and environmental impacts. For the sake of exemplification, in all existing buildings equipped with heating systems but without any primary air systems installed, it is necessary to introduce suitable ventilation systems with heat/enthalpy recovery units (double duct systems with heat exchangers); even though such technologies are already present in the market, the recovery systems should be further optimized, in terms of efficiency and safety related to the separation of air flows, not allowing contamination. Moreover, another consideration for current and future air systems is related to need of developing and adopting selective systems for the abatement of specific contaminants.

As previously mentioned, heat recovery, ventilation efficiency, aeraulic networks sealing and free cooling can be identified as important strategies for air systems. Indeed, these solutions are recognized as those having the greatest rooms for optimization, which can further increase in case these strategies are implemented simultaneously. Moreover, they can lead to the re-use of recirculation air as a means for reducing energy costs in competition with the use of recovery units. To conclude, it is important to specify that only the development of accurate and specialized feasibility studies, targeted on buildings uses and energy systems typologies, can give proper indications on the most efficient and sustainable solutions to be exploited.

How does AiCARR fit into this scenario?

AiCARR is an association that for over 60 years has been addressing these topics with competence and method, ensuring a highly scientific standpoint, but above all neutral and independent, being a non-profit association. We create and promote culture and method for sustainable well-being, contributing to the technological advancement of energy systems and to the definition of regulations on thermal energy production, distribution, and use.

Being present in all academic and institutional places where the energy future of our country is planned, AiCARR is recognized as an essential reference point for the definition of energy strategies and policies, as well as an irreplaceable interlocutor for anyone who deals with energy efficiency, environmental quality, renewable sources, and rationale energy use. AiCARR is also active at international level, thanks to the collaborations with other Associations or Federations, such as REHVA, ASHRAE, CIBSE and IEQ-Global Alliance. ■