

*With COP26 fast approaching, a growing number of commercial organisations have committed to a long-term net zero target for GHG emissions. Achieving this target could be commensurate with reducing emissions of air pollutants and improving air quality. What inventive air quality strategies/plans could commercial organisations implement that would simultaneously improve air quality and contribute to net zero goals?*

### **Opportunity in the building sector**

The building and construction sector is key in realising net-zero targets ahead of COP26.

The sector was globally responsible for 36% of energy consumption, 38% of energy related carbon emissions, and 50% of resource consumption in 2019<sup>1</sup> – the next decade of action within this sector is crucial in advancing to a net-zero future.

Organisations within this sector (architects, engineers, property developers, construction companies etc.) have the ability to design, construct, renovate and operate low-carbon buildings.

Following the pandemic, buildings that can also contribute to a population's health and wellbeing by improving outdoor and indoor air quality have become a priority. These organisations can endorse strategies to limit emissions of greenhouse gases and other harmful air pollutants in the built environment throughout all phases of development.

### **Working with nature**

Whilst climate change and air pollution must be mitigated, the surrounding environment of a building can also be used to its advantage, e.g., the path of the sun, climate, terrain, flora and fauna.

Natural ventilation and the synergy between air quality, energy demand and emissions is a perfect example of how buildings can work with nature. Natural ventilation can achieve energy efficiency whilst also improving health through efficient indoor air quality management.

The implementation of natural ventilation is often avoided where ambient air quality is poor. Thus, improving ambient air quality could increase the uptake of natural ventilation, subsequently reducing a building's energy demand and emissions. Equally, a reduction in a building's emissions could lead to less ambient air pollution and subsequently favour the uptake of natural ventilation in the surrounding environment.

### **Biomimicry**

The practise of 'biomimicry' learns from and mimics solutions found in nature to better human design across a range of sectors. Whilst the principles of biomimicry are not new, in that they have been around forever, advanced technical solutions have allowed designers to forget this essential design approach. Now more than ever, we need to relearn these skills and work with nature. Biomimicry has already begun to shape sustainable design and innovation within the building and construction sector.

Inspiration has been drawn from termite mounds and their relationship between structure and internal conditions. Architect Mick Pearce collaborated with Arup engineers to design Eastgate Centre in Zimbabwe, a combined office space and shopping centre, using design principles from the self-cooling mounds of termites.

Eastgate's construction materials have a high thermal capacity, which enables it to store and release heat gained from the surrounding environment. This process is facilitated with natural ventilation systems that enable passive internal airflow driven by outside winds<sup>2</sup>. These design features work together to regulate internal temperatures all year round. The development uses 90% less energy than a conventional building and has since saved the owners of the building \$3.5 million dollars in air conditioning costs.

Elements of biomimicry and biophilic design have also been adopted to improve indoor air quality through the sustainable building certifications of WELL, BREEAM and LEED. Features of WELL fitouts in commercial and office spaces have included green moss walls, graphic panels and wall designs that invoke nature, selected plants to help remove pollutants from the air.

### **Building materials**

The selection of sustainable, biobased materials, such as soy and hemp follow the principles of biomimicry in addition to reducing the emissions of volatile organic compounds and embodied carbon within a building.

Efforts should also be made to upcycle materials throughout development, following the principles of a circular economy, reducing emissions in the construction phase and positively impacting on carbon.

### **What next?**

Organisations should endorse strategies that 'work with nature' and move away from energy intensive technologies. Additionally, organisations should integrate elements of biomimicry and biophilic design principles to improve energy efficiency, indoor air quality, the health and wellbeing of the occupiers.

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<sup>1</sup> World Green Building Council. (2021) The Net Zero Carbon Buildings Commitment.

<sup>2</sup> Mick Pearce.(1996) Passively Cooled Building Inspired by Termite Mounds.