

## 1.2.2 The benefits of internal living walls

Indoor living walls have many benefits besides aesthetics, especially in the workplace. Through the process of photosynthesis, plants take in carbon dioxide (CO<sub>2</sub>) and release oxygen (O<sub>2</sub>). An increase in oxygen helps to keep us awake and alert. Studies show that plants naturally reduce our stress levels and make us feel more at ease in our surroundings. The presence of interior plants can increase productivity and inspire creativity amongst employees. Plants contribute to our overall wellbeing, which affects our mood, health and productivity. Positive moods, a part of wellbeing, are associated with enhanced learning and more efficient decision-making on complex tasks, greater use of logical reasoning techniques in problem solving, and higher benefits for all parties, and more innovative approaches, in negotiating. People working in a windowless room with indoor plants work more efficiently, are more attentive and have lower blood pressure than those working in the same room with the plants removed. A sense of wellbeing may also contribute to lower absenteeism in the workplace. Common areas utilizing plants, such as living walls, create spaces for employees to work together in collaborative groups. Plants also naturally absorb sound and soften noise pollution, so a living wall can be used effectively as a noise barrier in an acoustically loud space.



Figure 9: Ronald & Lu Partners living wall in a Hong Kong office  
Source: [https://commons.wikimedia.org/wiki/File:Ronald\\_Lu\\_%26\\_Partners\\_Green\\_Wall.jpg](https://commons.wikimedia.org/wiki/File:Ronald_Lu_%26_Partners_Green_Wall.jpg)

The average person spends over 90% of their time indoors, where we are constantly being bombarded with indoor air pollution. This includes toxic fumes such as formaldehyde, trichloroethylene, carbon monoxide, benzene, toluene, xylene, and other volatile organic compounds. Research undertaken by the National Aeronautics and Space Administration (NASA) has shown that chemicals such as formaldehyde and carbon monoxide can be removed from indoor environments by the plant leaves

alone. Trichloroethylene, benzene, toluene, xylene and numerous other toxic chemicals can be removed by the roots of plant (or by the microorganisms living around the roots which degrade and assimilate these chemicals). This leads to fewer health complaints such as headaches and respiratory irritations, as well as increases in focus and attention. This process is significantly enhanced with bio-filtration living walls that integrate the wall into the heating, ventilation and air conditioning (HVAC) system. Biowalls are used strictly indoors and are often quite large. Air is pulled through the plants and growth media, into the HVAC system and the freshened air is redistributed throughout the building. These systems can be several stories high and are usually found in building atriums [8, 9, 10].

Certain tropical plant species are more efficient than others at filtering the air. The chart below lists toxic chemicals commonly found inside buildings, and a few examples of living wall plant which are most efficient at absorbing and neutralizing them.

Common indoor toxic chemical	Plants best at removing these toxins
Formaldehyde (CH <sub>2</sub> O)	Peace lily ( <i>Spathiphyllum</i> sp.) English ivy ( <i>Hedera helix</i> ) Boston fern ( <i>Nephrolepis exaltata</i> )
Carbon monoxide (CO)	Spider plant ( <i>Chlorophytum comosum</i> ) Janet Craig Dracaena ( <i>Dracaena deremensis</i> ) <i>Ficus</i> sp.
Volatile Organic Compounds (VOCs)	Golden pothos ( <i>Scindapsus aureus</i> ) Devil's ivy ( <i>Epipremnum aureum</i> ) Philodendron sp.
Trichloroethylene (TCE)	Mother-in-law's tongue ( <i>Sansevieria trifasciata</i> ) Chrysanthemum ( <i>Chrysanthemum morifolium</i> ) <i>Dracaena</i> sp.
Benzene (C <sub>6</sub> H <sub>6</sub> )/Toluene (C <sub>7</sub> H <sub>8</sub> )/Xylene (C <sub>8</sub> H <sub>10</sub> )	Kimberley Queen Fern ( <i>Nephrolepis oblitterata</i> ) Orchid ( <i>Phalenopsis</i> sp.) <i>Dieffenbachia</i> sp.

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