# Creating healthy learning environments

## A Holistic Approach to Ventilation in Education

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**Good air flow and exchange is vital in educational facilities, especially given the health concerns highlighted by the COVID-19 pandemic.**

The last three years have brought the importance of good ventilation to the forefront in many built environments, but none more so than in educational facilities. Indeed, school ventilation has become a political issue due to its recognised health benefits, with guidelines and audits established in various states, including NSW and Victoria.

The World Health Organization recognised SARS-CoV-2, the virus that causes COVID-19, is airborne (2020). Among its many recommendations regarding managing the virus, included the provision to increase air flow and ventilation in schools and educational facilities.

However, establishing good ventilation and the free flow of fresh air has benefits beyond the global pandemic. Studies have shown that ventilation will reduce concentrations of indoor air contaminants (Daisey et al., 2003) such as gases emitted by furnishings, over-crowded spaces and water vapour, which, if left to build up can have negative consequences for your health (Sundell et al., 2011).

A good guide to gauging the level of ventilation and the indoor air quality (IAQ) of a room is the amount of CO2 it has compared to outside air (Schibuola et al., 2016). CO2 in outside air is about 400 parts per million (ppm) and a well-ventilated room with good indoor air quality will be no more than 800 ppm (Hanmer, 2021). This can be identified through utilising a carbon dioxide monitor.

## Impact of poor airflow & ventilation

According to the European Ventilation Industry Association (EVIA), a badly ventilated building will inevitably lead to ill occupants (EVIA, Indoor Air Quality). Poor indoor air quality can pose serious health risks: in the short term, it can lead to coughing, sneezing, fatigue and headaches. In the long run, it is also connected with a range of undesirable health effects, such as allergic and asthma symptoms, lung cancer, chronic obstructive pulmonary disease, airborne respiratory infections and cardiovascular disease (Neira & Prüss-Ustün, 2016).

**Children are particularly vulnerable to inferior air quality. By the age of 15, children have spent an average of 25% of their lifetime in educational buildings (Rajagopalan et al., 2021), therefore extra attention must be provided to this space.**

A 2017 paper by academic N.L Sireesha explained that “the body stress of the toxin contaminants” as being much more for “smaller children compared to the adults in settings that similar in character”, highlighting the greater impact of poor airflow on children.

## Rethinking airflow in school halls and other communal areas

There is a great amount of research outlining the importance of ventilation in classrooms, however larger halls, corridors, libraries and sports facilities should not be overlooked as students spend a significant amount of time of their day in these areas. Additionally, the number of students in these spaces vary throughout the day. Good ventilation ensures efficient airflow regardless of the amount of people in the space, the size of the room or what it is used for.

Another microsocial purpose of school halls are their versatility in hosting larger community events. School halls are spacious and suitable locations to hold elections, fairs, theatrical performances and even mother's group gatherings. Ensuring efficient airflow and ventilation in school halls have the potential to positively impact the health and wellbeing of the wider community.

A 2021 article by UTS Professors Hanmer and Milthorpe highlighted the lack of natural ventilation in many Australian educational facilities, asserting that the condition at many schools can be described as "poorly ventilated, indoor crowded environments".

The UTS study also found there are great learning and health benefits from installing advanced mechanical and hybrid ventilation systems to remove the pollutants from crowded, high-density spaces. The system is a standard used in many European schools.

In Australia, one of the repercussions of COVID-19 was to audit the educational system and subsequently, the level of ventilation in educational facilities (School News, 2021). A NSW audit confirmed most spaces in schools can be adequately ventilated through natural and mechanically assisted ventilation. This leads us to explore how we can optimise learning environments with ventilation.

## Optimising learning environments through ventilation

Scientia Professor Mat Santamouris the Anita Lawrence Chair in High Performance Architecture at UNSW, published a report on ventilation in educational facilities (2019) that determined ventilation was much more beneficial than air conditioning in schools.

Santamouris has expressed that a lack of ventilation will:

> **"Result in terrible indoor pollution and high biological contamination. Air-conditioning without ventilation for schools is the worst possible solution you can imagine."**

Mechanical ventilation is achieved through a number of ways, including the installation of turbine ventilators. Turbine vents are usually one of two varieties – active and passive. Passive vents (such as the Hurricane® range of vertical vane™ natural ventilation technology from Bradford Ventilation) require wind and the stack effect of temperature differences to spin the turbine, while active units are mechanically driven and can be controlled by smart building management systems (BMS) to operate under various conditions regardless of wind speed.

Bradford Hurricane ventilators are installed on the roofs of more than 300 schools and colleges throughout Australia.

With an effective, no-cost operation, this style of ventilator uses natural wind-driven ventilation, allowing its wind turbine to act as a centrifugal impeller. Natural ventilators can be used in all weather conditions, allowing a free flow of air even in cold weather or during rain.

Good ventilation also prevents the development of mould and mildew, which can bring further health problems, especially for asthmatics and individuals who suffer from allergies.

Active vents include the Bradford Ventilation designed, engineered and manufactured EcoPower®, the world's first true-hybrid™ ventilator in Australia. The EcoPower provides the best of both active and passive ventilation by allowing full mechanical functionality with electronic control, as well as the option to run as a natural wind-driven ventilator.

## Talk to the experts

Talk to Bradford Ventilation about effectively ventilating your next education facility project. Bradford Hurricane and EcoPower True-Hybrid Ventilation Technology can be installed in new builds or retro-fitted.

## About Hurricane Vertical Vane Natural Ventilation

The Hurricane range of vertical vane natural ventilation technology has been built to endure tough conditions and operating environments.

Bradford Ventilation products are designed, engineered and manufactured at its ISO9001 accredited facility in Seven Hills, Australia.

This range of ventilators has been performance tested to Australian Standard AS4740: Performance of Natural Ventilators to determine flow rate capacities and been wind load tested to 195km/h and tested for rain penetration to Australian Standard AS2428.1: Dynamic Wind Load & Rain Penetration Testing.

# About EcoPower True-Hybrid Ventilation Technology

EcoPower is the world's first true-hybrid ventilator. Designed, engineered, and manufactured in Australia by Bradford Ventilation, EcoPower incorporates the leading design of Hurricane vertical vane turbine ventilator with a high efficiency electronically commutated (EC) motor for reliability and on-demand peak performance, when required.

Bradford Ventilation is an ISO 9001:2008 certified manufacturer and the world leader in turbine ventilator technology.

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