

Natural Ventilation



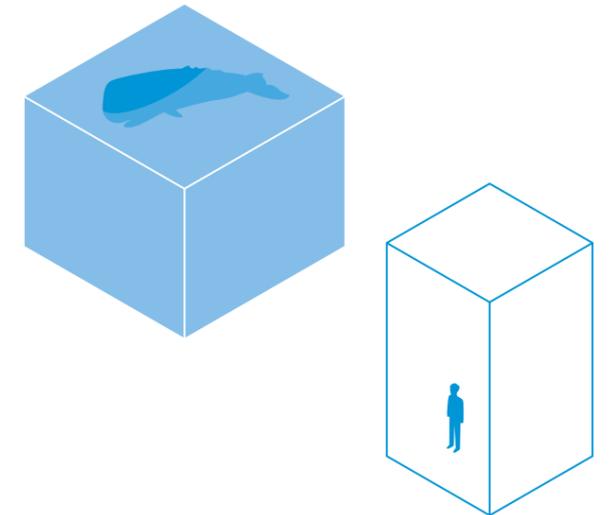
BENEFITS OF NATURAL VENTILATION IN ARCHITECTURE

Whales spend more time on the surface...than humans spend in the outdoors.

Sir David Attenborough

90% is the time that we spend indoors. We are basically an “indoor species.”

For this reason, the window automation for natural ventilation becomes of crucial importance for creating safe, sustainable, comfortable buildings.



Different buildings, same benefits

Education

- › Comfortable environment.
- › Better classroom attendance.
- › Improved acoustics.
- › Greater attention span.
- › Lower infection risk.

Healthcare

- › Lower infection risk.
- › Connection to nature.
- › Improved mood + mindset.
- › Motivation to get better.
- › Shorter stay in hospital.

Offices

- › Improved productivity.
- › Reduced Sick Building Syndrome (SBS).
- › Job satisfaction.
- › Less stress.
- › Pleasant space.

Everywhere, for people with disabilities

- › Improved quality of life with a greater sense of environmental control.
- › Operate from wheelchair, bed, or sofa.
- › Fresh air + connection to nature.

Planet

- › Less energy consumption.
- › Reduced greenhouse gas emissions.
- › Minimizing ozone depletion.
- › Lowers heat island effect.
- › Fewer E-waste items.

Developers

- › Capital cost savings (15% compared to HVAC).
- › Lower operating costs (70%-90% lower compared to HVAC).
- › Prestige of a sustainable building.
- › Increased rent per square foot.
- › Increased market value of building.

Buildings, like people, need to breathe.

NATURAL VENTILATION AND ENERGY EFFICIENCY

40% of global CO₂ emissions come from real estate. 70% are produced by building operations.

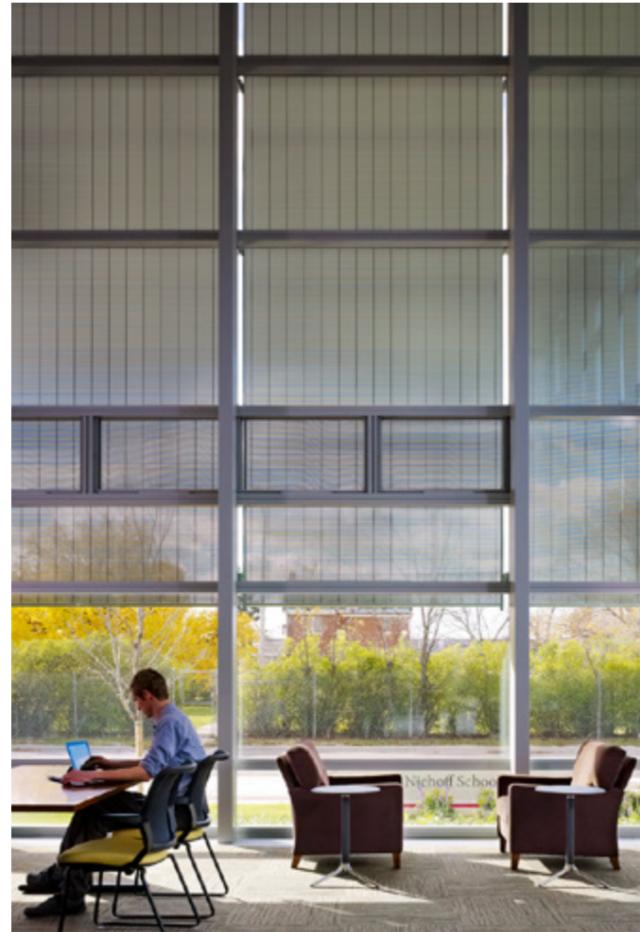
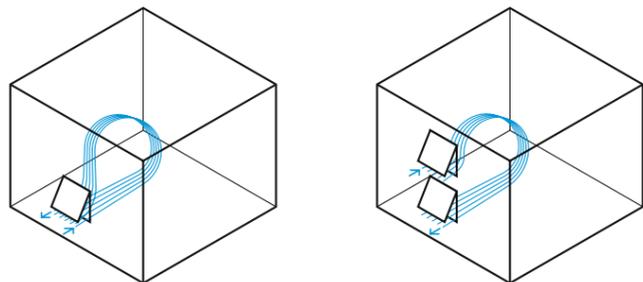
The global policies implemented in recent years have identified the reduction of energy consumption as the key point on which to intervene.

Research done by the World Green Building Council (WGCB) highlight how this aspect is the starting point to design new buildings and affects the criteria of renovation of existing ones. The application of this principle leads to the reduction of the use of air conditioning and mechanical ventilation: one of the most effective methods is the night cooling ventilation (automatically operating the windows during the night, bringing fresh air into the building and also restoring the correct balance between CO₂ and oxygen).

Natural ventilation has always been intended as an improvement in the indoor quality of the air only; with the advent of Building Management Systems, window automation has been interfaced with the other systems like air conditioning, heating, and forced ventilation in order to obtain energy savings as well.

For the above aims, in the last years the market is asking for new technologies for the integration in building management system and be part of the active system operate on daily base.

Natural ventilation can be obtained by the following configuration:

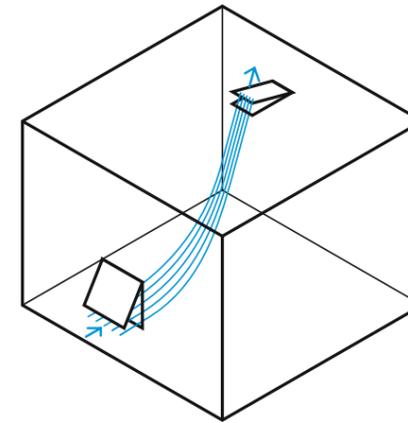


< SINGLE SIDE VENTILATION

One or more windows on the same facade.
For obtaining a good ventilation result, the room width should not exceed 2,5 times the room height.
Not recommended for meeting room and classroom.

> CROSS VENTILATION

One or more windows open on opposite facade side. This solution uses the wind pressure difference present on each windows. Most significant result can be obtained when the room width is 5 times more the room height.



< STACK VENTILATION

Use the superposition effect given by facade window and roof windows and the different pressure generated by warm air collected in the top part of the building. Most significant result can be obtained when the room width is 5 times more the room height and the roof windows are installed in an appropriate way aim the wind pull out the heat increasing the natural ventilation effect.

Natural ventilation is maximized by cross-ventilation. In normal wind conditions, the side of a building facing the wind will be subject to a positive pressure and the opposite side will have a zone of negative pressure. Installing adequate window opening on these two sides of the building, a positive flow of air through the interior, from positive to negative pressure, is encouraged.

Ventilation effectiveness depends on wind speed, the angle at which the wind strikes the window, and the location and size of the windows. The efficiency is limited to only 12–23% in a room with a single opening; this improves up to 51% if windows are located on adjacent walls and 65% can be reached with windows also on opposite walls.

