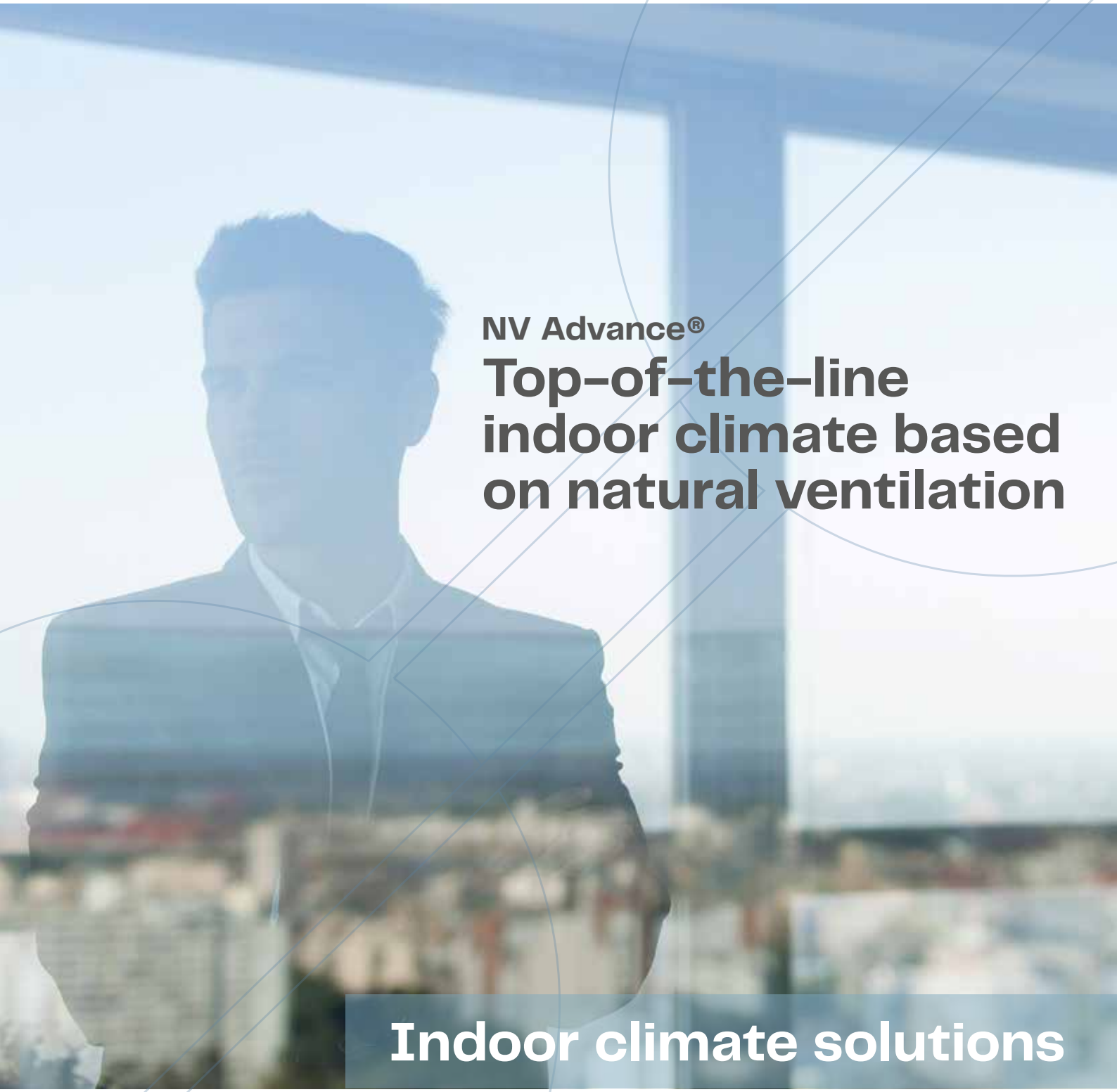
Window Master®
Fresh Air. Fresh People.

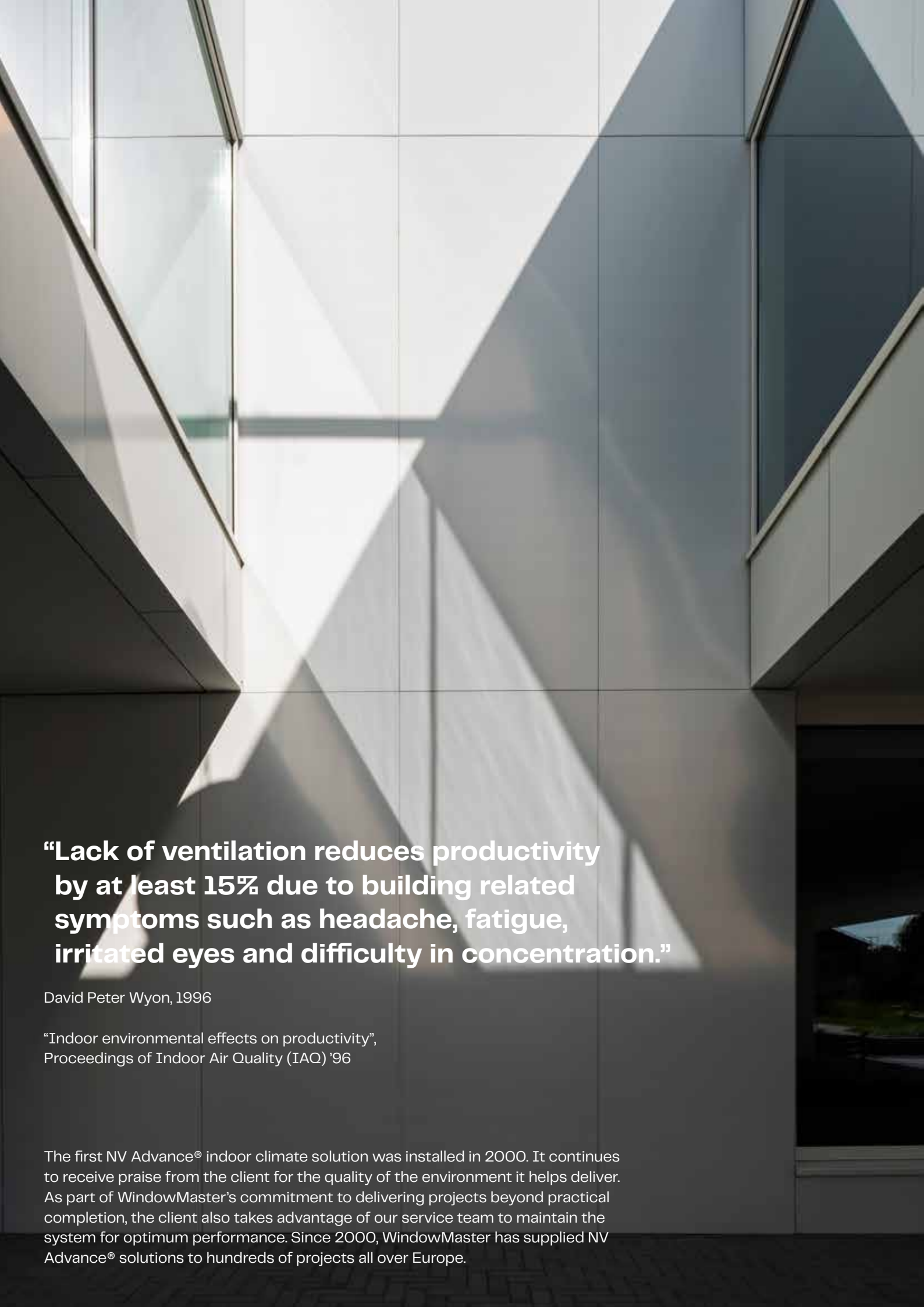


NV Advance®

Top-of-the-line indoor climate based on natural ventilation

Indoor climate solutions

NV Advance® is our top-of-the-line indoor climate solution based on natural ventilation and intelligent controls. Ideal for large buildings with more than 8 ventilation zones



“Lack of ventilation reduces productivity by at least 15% due to building related symptoms such as headache, fatigue, irritated eyes and difficulty in concentration.”

David Peter Wyon, 1996

“Indoor environmental effects on productivity”,
Proceedings of Indoor Air Quality (IAQ) ’96

The first NV Advance® indoor climate solution was installed in 2000. It continues to receive praise from the client for the quality of the environment it helps deliver. As part of WindowMaster’s commitment to delivering projects beyond practical completion, the client also takes advantage of our service team to maintain the system for optimum performance. Since 2000, WindowMaster has supplied NV Advance® solutions to hundreds of projects all over Europe.

Content

WINDOW MASTER®
Fresh Air. Fresh People.

Improving the environment. Indoors and out

Ventilation plays an important role in modern building services. A role that can make the difference between a space that is comfortable and energy efficient, and one that overheats in summer and wastes heating energy in winter, adding considerably to utility costs.

Currently buildings account for as much as 50% of energy use and 45% of carbon emissions. But with increasing focus on energy consumption, carbon reduction and by minimising running and maintenance costs, effective natural ventilation can provide a robust and reliable solution – enhancing the indoor environment, comfort, productivity, and reducing the lifetime costs of the building.

WindowMaster and natural ventilation
For more than 25 years, WindowMaster have supplied effective natural ventilation and smoke ventilation solutions to a wide range of buildings all over Europe. This experience and knowledge enables us to continue to develop products and solutions for the best sustainable indoor climate possible. With our demonstrated competencies within all parts of the project – from ventilation strategy and facade design through to control system design and commissioning – the WindowMaster solutions are designed to meet both the design intent of the team and the technical requirements of the client.

NV Advance®
NV Advance® is the most widely used stand-alone control system for natural ventilation. It has been proven over 20 years of development and practical use by thousands of users and clients in a wide range of sectors, including education, offices, healthcare, sports facilities and shopping malls – any building type where there is a desire to use natural ventilation.

The system is a complete solution for controlling the indoor climate through intelligent control of the windows, louvres, windcatchers and mechanically assisted mixed mode solutions. The control strategies in NV Advance® have been developed to ensure the best possible indoor climate with the lowest possible environmental and CO_2 impact.

Find out more
For further information on intelligent façade automation, WindowMaster control solution options and our consultancy services, please visit our website at **windowmaster.com**

The common challenges of natural ventilation

The gains from natural ventilation are obvious: a good indoor climate, reduction in CO_2 emissions as well as in energy consumption – and consequently lower energy costs.

But historically, there has also been extensive coverage of modern buildings with failing natural ventilation strategies or control as a result of factors like noise, overheating, excessive draughts, poor energy performance and poor operation by the BMS during more challenging conditions.

A complex issue
All these challenges demand a sophisticated solution based on extensive knowledge and a wide range of competencies in order to help prevent common problems.

The optimum amount of ventilation depends on the demands of the space due to either potential overheating or air quality. With too much ventilation you run the risk of draughts, discomfort and excessive displaced heat loss and poor energy performance/

Photo: LWA Architects

heating bills. But the capacity to deliver the right amount of ventilation also changes with the driving factors such as wind speed and direction relative to the vents, and outdoor temperature. In addition, it is important to take into account accurate control, heat loss, noise of operation, security, health and safety and other factors such as rain.

With more basic control strategies research suggests that in order to achieve balanced energy performance, the ventilator or window positions may need to change 30–40 times per day per vent. For a typical classroom that may mean opening or closing windows 160 times per day to deliver a balanced climate and energy performance.

This shows that automated, intelligent ventilation is much more than just a simple on–off operation based on one set point. Basic control strategies that do not take into account all these variables, can therefore often introduce more problems than they solve.

How to solve the challenges of natural ventilation

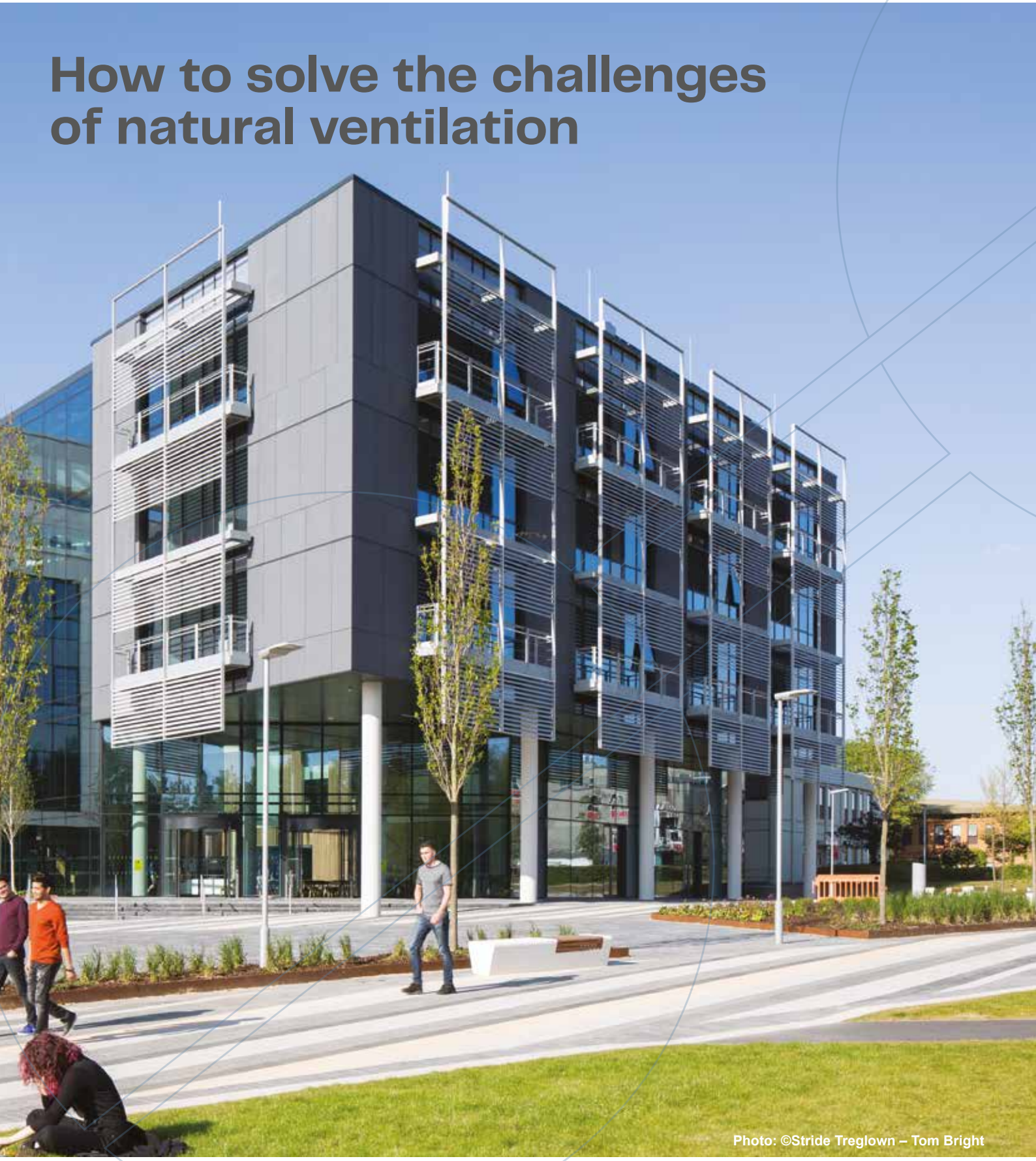


Photo: ©Stride Treglown – Tom Bright

A long list of variables must be taken into account when designing the optimal solution for natural ventilation. WindowMaster's solutions have demonstrated that all these challenges can be dealt with through the right guidance, thereby creating a comfortable indoor climate while improving the environment – indoors and out

A few of the factors that make the NV Advance® a unique solution are:

Building location and surroundings
Applying the right components and the right technology is far from enough when creating an optimal solution for natural ventilation. The building's location and surroundings play an important role in setting all the necessary parameters. We therefore analyze wind directions and speed through CFD calculations to find the perfect opening angles (see more on page 12).

Unique MotorLink® technology
By using MotorLink® technology, NV Advance® operates with millimeter by millimeter precision and gives feedback from each single actuator. The solution offers genuine synchronisation between multiple actuators on the same window as well as three different operation speeds that can be applied according to demand for quiet operation (see more on page 11).

Accurate surveillance of the indoor climate
NV Advance® constantly monitors both the indoor climate and the outside weather conditions; thereby adjusting the amount of ventilation and keeping the indoor climate at a comfortable level. Indoor sensors in all zones register temperature, and CO_2 levels and a weather station collects data from the outside (see more about products on page 24).

Accurate programming for effective automation
A balanced indoor climate is dependent upon constant control of the exact position of the windows to maintain the target levels of temperature and CO_2. To achieve this, NV Advance® uses a unique combination of CFD analysis, proven programming and position feedback to consistantly match ventilation rates according to changing demand in the spaces and the driving (and often limiting) factors of outside weather.

What is NV Advance®?

Photo: Andrew HATFIELD

NV Advance® ensures excellent indoor climates by using an advanced control strategy for precise positioning of the windows.

The strategy takes the following into consideration:

- Building location and surroundings
- Building function
- Wind speed and direction, outdoor temperature and rain
- Window facade and roof construction and the derived air streams through the windows
- The seasons
- Current temperature and CO_2 level in each room in the building

NV Advance® uses the ISO certified open field bus KNX for communication between MotorControllers, sensors, keypads and system panel. WindowMaster's NV Advance® software, optimised for natural ventilation, has been proven in more than 1000 buildings in Europe, and is easily interfaced to other site BMS to provide a seamless single point solution, or a turnkey stand-alone solution.

The software is modular for individual room control and is able to control everything from a few rooms to more than 250 rooms in a single system.

Safety features

The system is able to close or limit the opening of the windows when it is raining or too windy. NV Advance® can be combined with smoke ventilation so that the same window is used for natural ventilation during the day and smoke ventilation in the event of a fire.

NV Advance® uses these ventilation modes:

- Comfort ventilation
- Optimized night cooling
- Trickle ventilation
- Pulse ventilation
- Fresh air function
- Manual override

NV Advance® and MotorLink® technology

NV Advance® uses the well-known MotorLink® technology developed by WindowMaster to control windows and create optimum indoor climates in buildings.

This technology enables a versatile range of functionality in order to fulfil requirements of modern facade design. In control solutions utilizing MotorLink® technology there is digital data communication to every single window actuator.

The large range of functionality available within the MotorLink® technology enables the controls supplier to deliver a more robust, flexible and intelligent control solution to meet the individual project requirements.

Top 5 benefits

Whisper quiet operation
Get nearly soundless window actuator operation with MotorLink® enabled TrueSpeed™

Accurate control and feedback
Run actuators with precise speed and to a specific degree of opening, plus get real-time feedback of openings and faults to the BMS

Synchronized, dynamic facades
Movement and control across multiple actuators is smooth when opening and closing for the highest level of facade aesthetics

Easier installation
Because MotorLink® MotorControllers manage the communication from the window actuators to BMS, there is less cabling directly to BMS

Safe operation
When in close mode, window actuators can detect obstacles preventing operation and then reverse to release the object

Modelling wind pressure – essential to provide the optimum indoor climate

From aircraft design and Formula 1 aerodynamics to window automation solutions, modern computing power and software brings us accessible and effective tools to better understand how things will react under different conditions – and thereby to also accurately predict and better control the outcome. CFD (Computational Fluid Dynamics), when expertly utilised, offers a time and cost effective way of simulating the interaction between weather variables and building characteristics, in order to effectively program the control system.

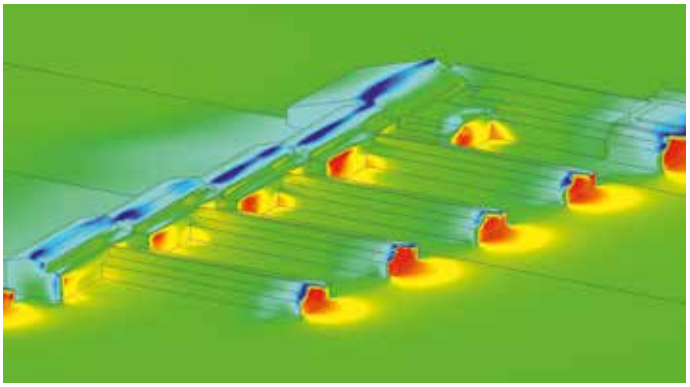
Using CFD to model the wind pressure around a building can effectively reduce the time spent trying to write individual algorithms for each set of windows. It gives accurate profiles to follow with predictable and therefore controllable and desirable outcomes, even as variables change, instead of having to use a trial-and-error-based approach until the desired outcome might be achieved.

NV Advance® utilises this in a proven approach as the results of the CFD analysis form the basis of wind pressure coefficients (Cp values) for each window for a total of 16 different wind directions. These parameters, according to the demand for ventilation in each space, form an active part of the control algorithms in the NV Advance® software. The required opening angle of each window is calculated based on wind direction and wind speed affecting that room, and the demand for ventilation within it

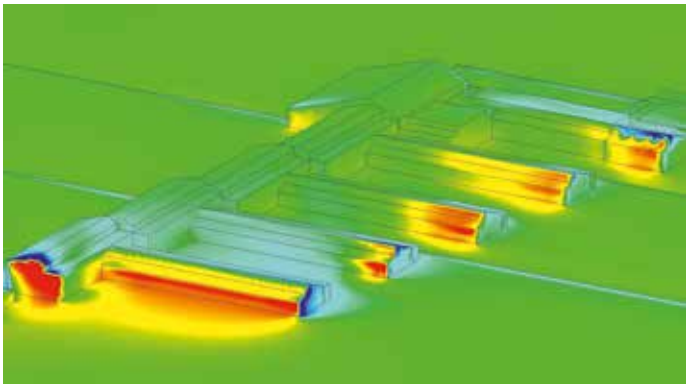
Example

The figures on the right show the pressure distribution for two different wind directions (E and S) for an NV Advance® project. The different colours indicate the magnitude of the pressure on the facade of the building. Red indicates where on the building the highest pressure (excess pressure) occurs, whereas blue indicates low pressure (negative pressure).

It is obvious that there is a great difference in wind pressure on the facade depending on wind direction, which is why the windows on different elevations in a space need to be controlled independently depending on demand, wind direction and speed to achieve the correct ventilation rates.



CFD analysis, wind direction: E



CFD analysis, wind direction: S

NV Advance® features

Optimised night cooling

Night cooling is a critical component to enhance the performance of any naturally ventilated building, which is used during the summer time.

Small openings (that satisfy security requirements) allow the cooler night-time air to enter the building in order to remove heat and energy from the internal fabric of the building. This cooling allows the structure to re-absorb some of the internal heat gains the following day, thereby reducing the daytime air temperatures to more comfortable levels. Thermal mass helps enhance the benefit of night cooling but even a light weight building can see a 30% reduction in the number of hours at higher temperatures.

Basic controls for night cooling often operate according to a fixed time, or purely based on air sensor readings which can lead to over or under cooling. NV Advance® monitors each zone every day, looks at weather conditions and thereby calculates the optimised night cooling requirement – while ensuring the actuators never open further than the insurance company or security concerns allow. WindowMaster can advise on a range of solutions to overcome security concerns, such as vent location, selective use of louvres, internal courtyards, integrating with CCTV and PIR detectors for a fully intelligent and secure night cooling strategy.

Heating control

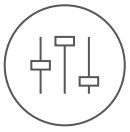
Heating control can be an integrated part of the NV Advance® system and is closely linked to the natural ventilation control. This link ensures that the NV Advance® system is able to minimise heat energy loss in the winter while it uses natural ventilation to create a high-quality indoor climate. Heating control includes valves to control water flow in radiators or under-floor heating, temperature sensors and temperature control software.

Data Logging

NV Advance® provides continuous logging and storage of all data concerning interior climate, weather conditions, window positions and any system errors. The gathered data can then be analysed and compared at any time later on and therefore play an active role in things such as adjustments to the system and troubleshooting. Access to the data is quite straightforward. For example, the users of the building can easily access an overview using NV Visual™, and with the option of remote access via the Internet, it is also simple to access and communicate the data for further processing without even being on-site.

Climate screen

The climate screen is an optional touch screen display showing climate and energy consumption in the building in an easily accessible graphic format. The screen is also able to show the status of the NV Advance® system and can be used to open/close windows centrally as required.



NV Visual™

A web-based solution gives the user simple and intuitive access to monitoring and adjusting the NV Advance® system. NV Visual™ includes visualisation of building, floor and room status and a trend of optional historical data and the possibility of opening/closing windows or changing basic parameters from the screen. No additional software or licenses are needed on the user's PC. With optional extension to NV Visual Desktop™ employees can interact with their own windows from their desktop screens.

Solar screening

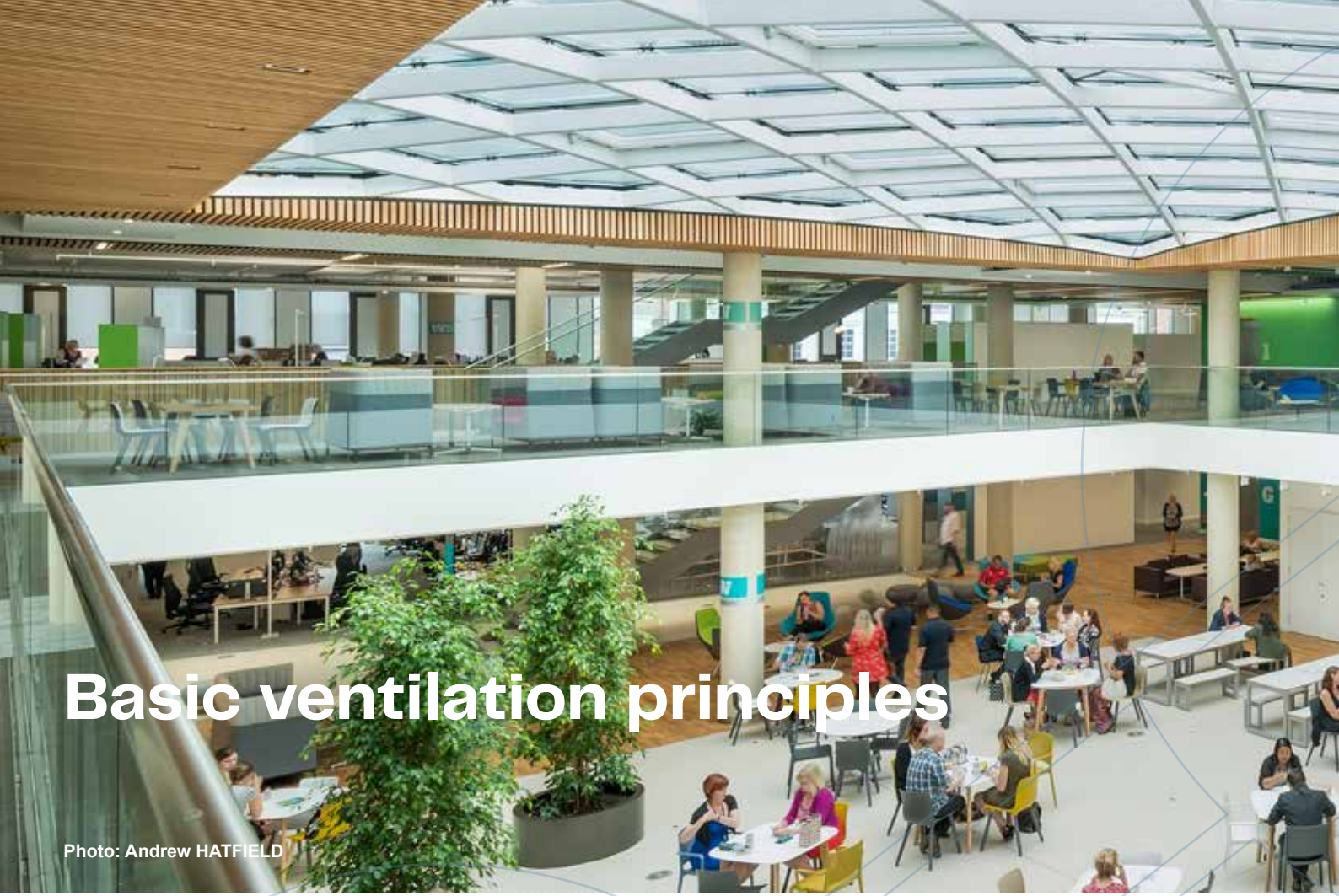
Effective control of the sun screening is an important contributor to maintaining a comfortable indoor climate as the sun screening can be used as both a shield against extreme overheating and as additional insulation in the winter. NV Advance® has a built-in sun screening controller for venetian blinds and awnings. The controller includes functions such as timed up/down function linked to a calendar, up/down function depending on lux levels (alternatively watt/m^2) and the option of manual input.

Integrated smoke ventilation

Many buildings are subject to statutory requirements for the opening of windows in the event of fire. NV Advance® can incorporate smoke ventilation control with natural ventilation control which means that the same equipment – window actuators and MotorControllers – are used for both functions. WindowMaster offers a range of EN 12101-certified combinations of profiles and actuators that can form part of combined natural ventilation/smoke ventilation solutions.

Additional controls

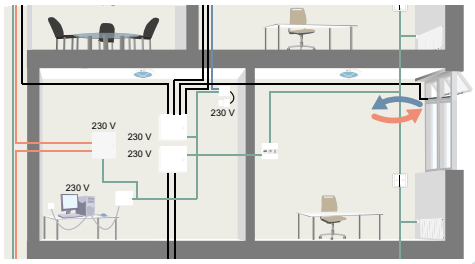
The NV Advance® system can also be set up to control other installations such as wind catchers, air conditioning units (mixed mode ventilation), louvres, etc.



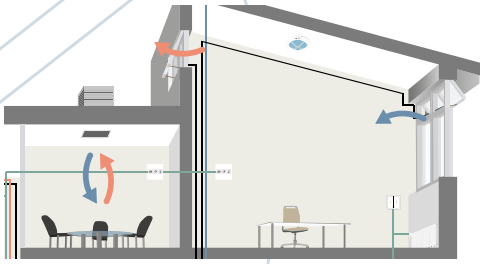
Basic ventilation principles

Photo: Andrew HATFIELD

The driving forces in natural ventilation are thermal buoyancy and wind pressure on buildings. The design of the building, the form of the window openings and location have a significant impact on the quality of the indoor climate



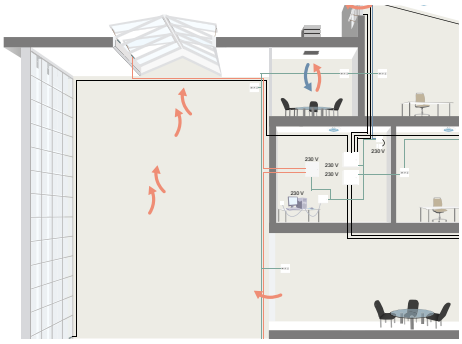
Single-sided ventilation
The windows can only be opened in one side of the room. The amount of fresh air coming into the room is limited by single-sided ventilation. It is recommended that the depth of the room should not exceed 2.5 times the clear height of the room and that the space is not used for high density spaces such as meeting rooms, classrooms or similar.



Cross-ventilation
Windows in two or more façades can create cross-ventilation in a room. The ventilation is powered primarily by the wind, which creates differences in wind pressure on the facades in which the window openings are located.
As a rule of thumb cross-ventilation can be used effectively when the depth of the room is up to 5 times the clear height of the room.

Choosing the right solution

Our engineers are ready to assist you in finding the right solution for natural ventilation. Through the use of steady state and dynamic analysis, we are able to confirm the suitability of the chosen ventilation principles and provide you with a specific natural ventilation suggestion.



Stack-ventilation

Stack-ventilation occurs when there is a height difference between openings – i.e. between façade and roof windows. This type of ventilation is primarily driven by warm air rising to the top, whereby it creates a pressure difference which drives the ventilation. As a principle rule stack-ventilation can be used effectively when the depth of the room is up to 5 times the clear height of the room. The best effect is obtained when the openings for natural ventilation are placed so that the wind pressure contributes to an increase in the driving pressure.

Mixed mode ventilation

In a number of projects you may choose to install a mixed mode ventilation solution that exploits the advantages of natural ventilation and support these with mechanical ventilation. Natural ventilation is used for most of the year to ensure a flow of fresh air and to cool the building, while the mechanical ventilation – usually with heat recovery – is used in the cold winter months to reduce the heat loss in the building and to pre-heat the fresh air supply. Mixed mode ventilation solutions can come in many different formats.

NV Advance®
– a system overview

The illustrated building shows an example of how NV Advance® can benefit from all ventilation principles and integrate with the building's BMS in a complete solution.

Ventilation principles: The illustration shows examples of single-sided ventilation, cross ventilation, stack-ventilation and mixed mode ventilation. Read more about the ventilation principles on page 16.

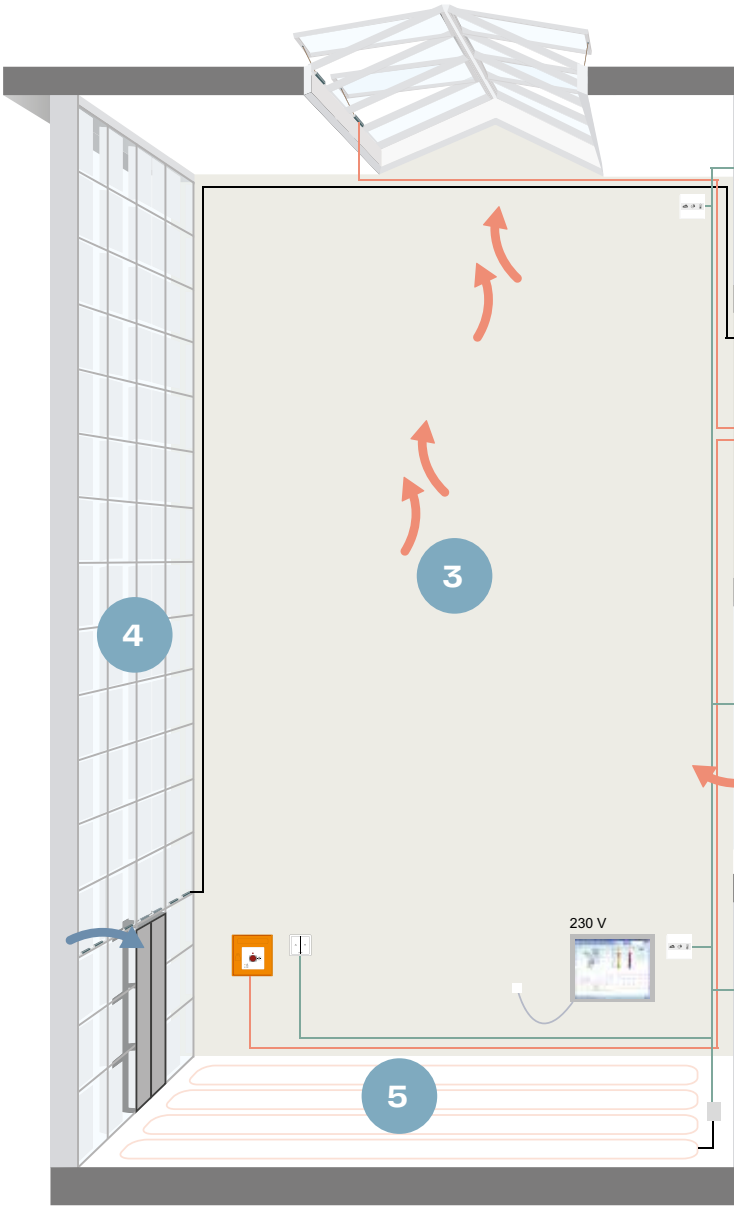
1. A weather station on the roof transmits data on outdoor conditions (such as temperature, rainfall, wind speed and direction), allowing the NV Advance® system to accurately control the positioning of the windows.

2. Natural ventilation is also an option in rooms without windows to the outside. For example, as shown here, a windcatcher on the roof can be used to take in fresh air while letting out air that has been heated.

3. In the high-ceilinged atrium, stack-ventilation occurs via automatically controlled openings in the facade, which let in the fresh air, and skylights that exhaust the rising hot air. In this area the NV Advance® system is used to control the comfort ventilation and is also combined with the smoke ventilation strategy, so a fire switch is therefore placed on the wall. On the wall there is also a climate display screen, where the users can monitor data on the internal and external conditions of the entire building or in individual zones.

4. Automatic sun protection on the windows of the building acts as a safeguard against overheating in the summer and as extra insulation in the winter.

5. With NV Advance®, heating control can be integrated using a motorized valve to control water flow in the radiators (in office rooms) or underfloor heating (in the atrium), temperature sensors and temperature control software, which together reduce heat loss during the winter.



Symbols:

Keypad

Room sensor
temp./CO_2/humidity

MotorController

Heat control

System panel

PIR detektor

Weather station

Climate screen

Mechanical ventilation
(mixed mode ventilation)

Smoke control panel

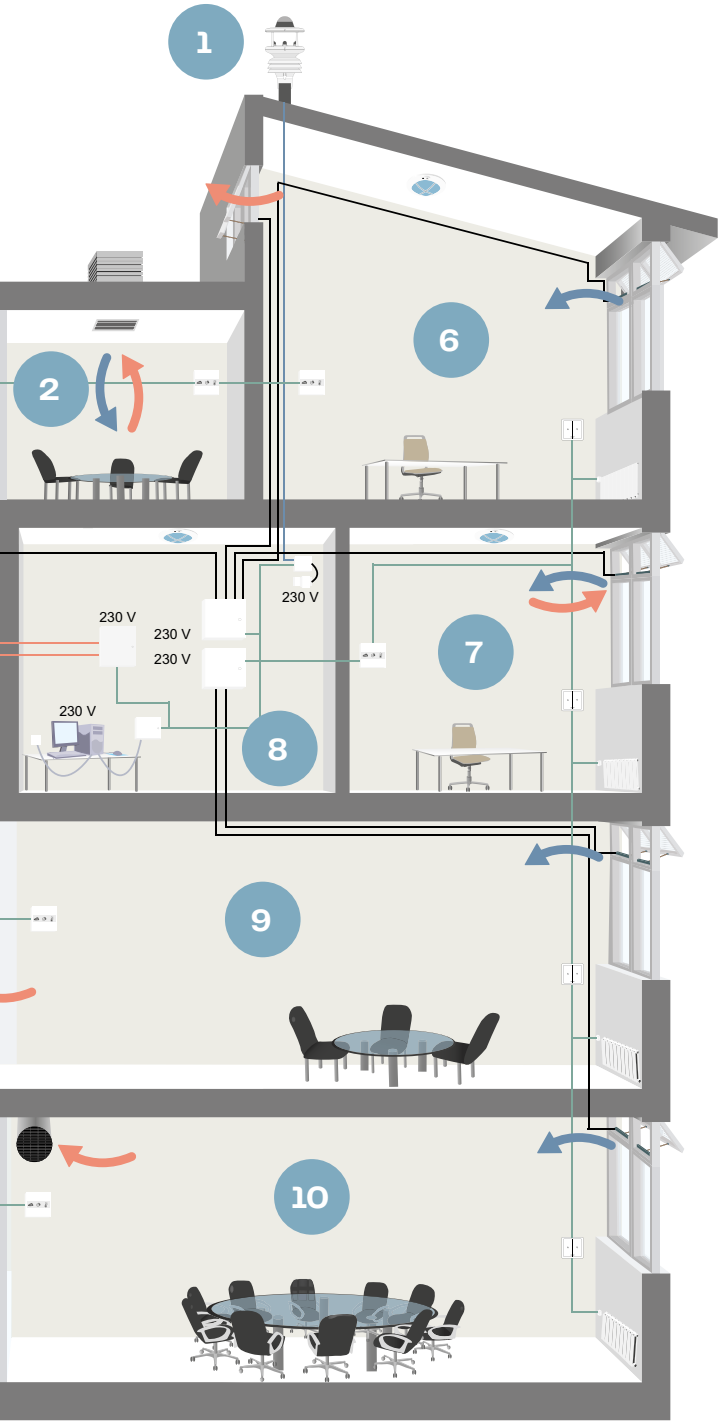
Power supply

Break glass unit

Computer

Cabling:

- Smoke & Heat cable
- KNX cable
- 230 V (supply)
- 3-core cable without earthing
- Cable for weather station
- Patch cable



6. Cross ventilation should be used if there are windows on both sides of the room. Sensors on the wall measure temperature, CO_2 levels and humidity, while an operating switch makes it possible for the user to control the windows and sunshades manually. A PIR detector is placed in the ceiling to detect movement and turn the lights on/off

7. In rooms where there are only windows on one side, one-sided ventilation should be used. An interior climate sensor and operating switch are attached to the wall, while a PIR detector is placed in the ceiling.depending on whether the room is in use.

8. The building's control room houses all the controls hardware; including a Server PC, system panel, MotorController and power supplies (read more about the features of the different products on page 24). A smoke ventilation panel is mounted on the wall for the atrium smoke ventilation system.

9. In this room cross ventilation is used, where the heated air it directed out into the atrium before rising up and leaving the building via the skylights.

10. For mixed mode ventilation control, the NV Advance® can be integrated seamlessly with mechanical ventilation solutions. Here we show a solution with mechanical extraction where a fan can be triggered to supplement the natural ventilation when required.

Calculation example

Initially, the dimensioning of natural ventilation can be based on the simple rules of thumb described in BB101. Depending on the ventilation principle different opening areas are required:

Single-sided ventilation: 4% of floor area
Cross ventilation: 1.5% of floor area
Stack ventilation: 1.5% of floor area

It is WindowMaster's experience that the opening areas in many cases can be reduced by including a proper control of the windows. Our experience shows that the size of the required opening area is very different from project to project, and usually lies within the following ranges:

Single-sided ventilation: 1.5–4% of floor area
Cross ventilation: 1–1.5% of floor area
Stack ventilation: 1–1.5% of floor area

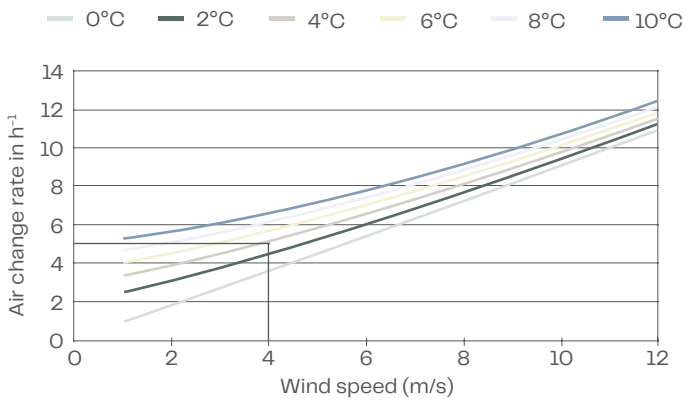
The example is based on a room with an area of 65m^2 with a ceiling height of 3m. The room is ventilated via openings in the two facades and in the roof. The opening area is calculated as 1.5% of the floor area.

The figure on the left shows the air change calculation when both wind and thermal buoyancy have been taken into consideration. The X axis represents the current wind speed (m/s) and the Y axis the possible air change rate. The nuances of the blue colour in the graph indicates the temperature differences between the inside and outside air. A temperature difference of 4°C, for example, corresponds to an indoor temperature of 24°C and an outdoor temperature of 20°C.

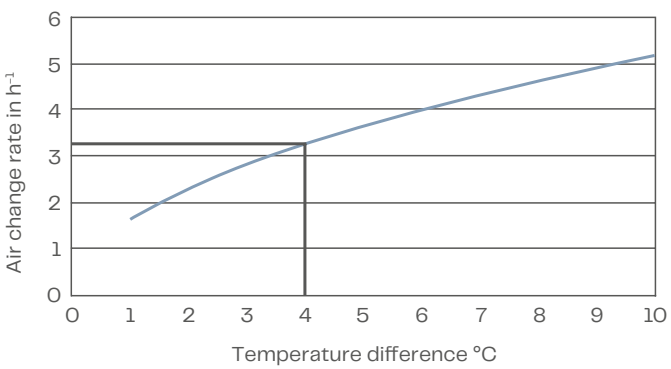
With a wind speed of 4.0 m/s (monthly average wind speed inland) and a difference between outdoor and indoor temperature of 4°C, an air change rate of 5.1 h^{-1} can be achieved in the room.

Even on calm days when only thermal buoyancy can be relied upon, it is still possible to create a relatively high level of air change rate. The figure on the right shows that with a difference of 4°C between indoor and outdoor temperature, an air change rate of 3.3 h^{-1} can be achieved.

Calculated air change rates based upon temperature differences and wind speed

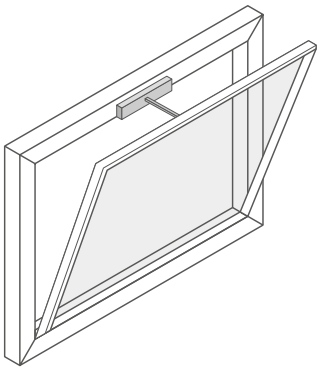


Calculated air change rate with thermal buoyancy

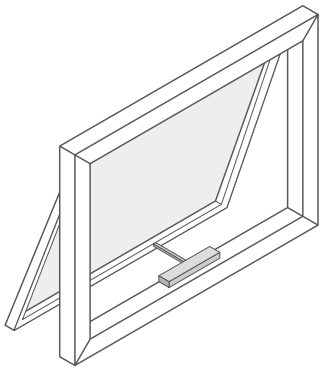


Recommendations for design with natural ventilation

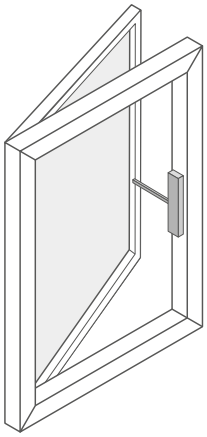
- It is important that the automatically controlled windows are positioned as high within the facade of the space as is possible.
- Experience has shown that it is also important for users to have the facility to locally override the automated openings, via individual switches, when greater or less opening of the windows is desired.
- In buildings with natural ventilation the height of the room should be at least 2.5 m and preferably slightly higher for the best indoor climate.
- The automatic windows should ideally be top-hung outward opening or bottom-hung inward opening and have a height of 400–500 mm.



Bottom-hung inward opening



Top-hung outward opening

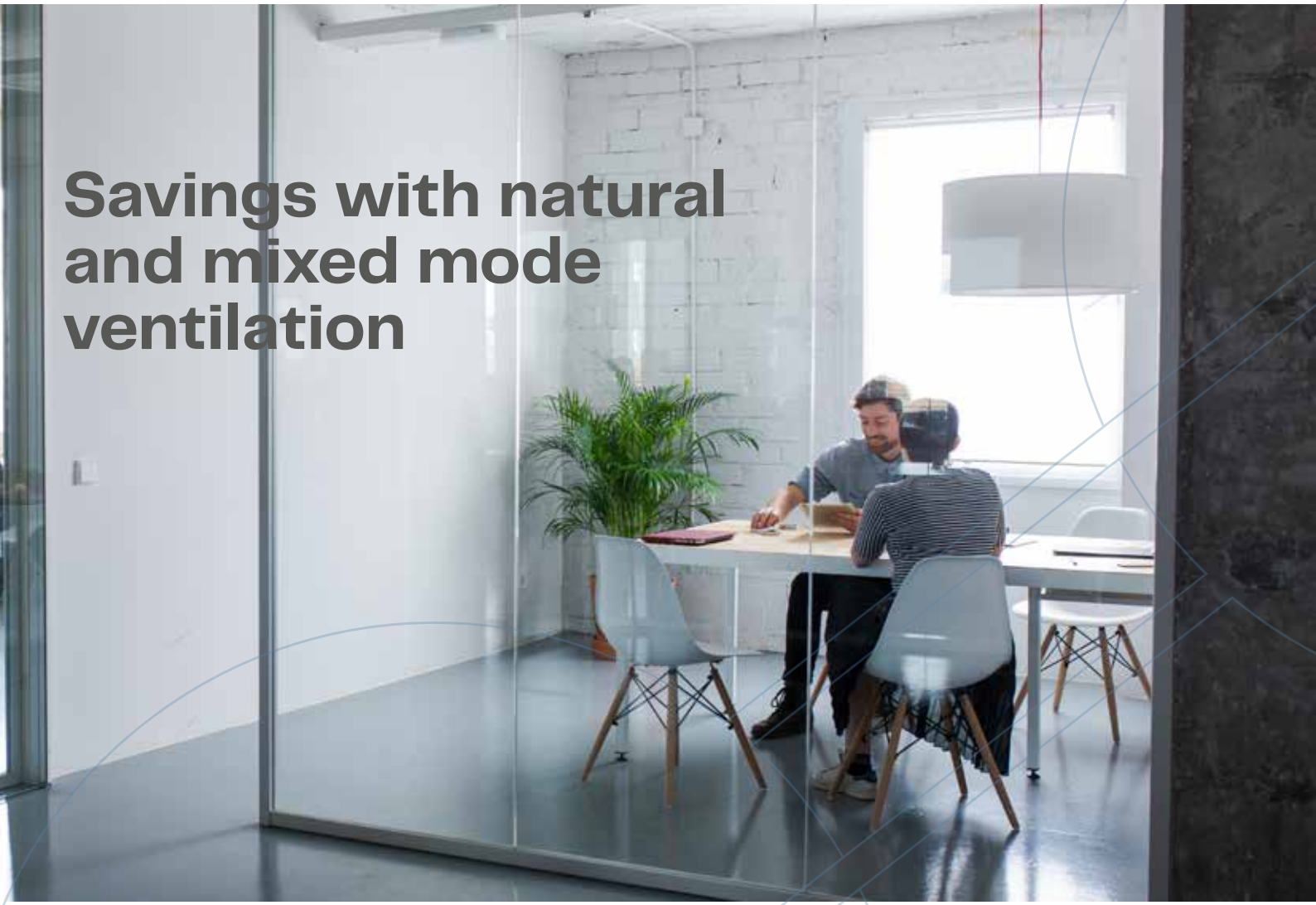


Side-hung outward opening

For other types of windows, please contact us

Matching window actuator and profile

Our engineers are happy to provide proposals for concealed, partially concealed or surface mounted solutions. We can provide proposals, for example, for how to customise the window profile to achieve the optimum integrated solution between actuator and profile



Savings with natural and mixed mode ventilation

The Fraunhofer-Institute for Building Physics in Stuttgart has performed detailed energy calculations of an office building with an area of almost 3000m^2 equipped with either natural (NV), mechanical (MV) or mixed mode (MMV) ventilation. The building performance was investigated in three different locations in Europe; Copenhagen, London and Munich.

Indoor air quality (CO_2) and thermal comfort (operative temperature) were evaluated in the report[1], in accordance with the European Norm "EN 15251" Category II. The indoor climate was kept identical for all three ventilation principles as this would make the consumed energy more comparable.

Category	Operative Temperature (Winter) [°C]	Operative Temperature (Summer) [°C]	Operative Temperature (Transient) [°C]	Carbon Dioxide Level during the year [ppm]
II	$20 \leq t_0 \leq 24$	$23 \leq t_0 \leq 26$	$20 \leq t_0 \leq 26$	≤ 900

Requirements to the operative temperature and carbon dioxide level according to [EN 15251] Category II.

Energy consumption
The figure on the right shows the primary energy consumption (sum of heating and fan electricity demand multiplied with primary energy factors) for the three ventilation principles.

The result shows that natural ventilation uses 9–11 kWh/m²/year, mechanical ventilation 20–25 kWh/m²/year and mixed mode ventilation 7–8.5 kWh/m²/year. Mixed mode ventilation enables energy savings of 20–25% compared with natural ventilation and 60–70% compared with mechanical ventilation.[2]

Based on the Fraunhofer IBP energy calculations, the CO_2 emissions and the economy seen over a 20 year period are calculated:

CO_2
In comparing the CO_2 emissions from electricity use and heating it can be seen that natural and mixed mode ventilation emits much less CO_2 compared to a mechanical system during one year. The mixed mode ventilation emits approximately 20% less than natural ventilation.

Economy
A Life Cycle Cost (LCC) over a 20 year period has been performed, which includes the capital cost, maintenance of the systems and the operational cost (electricity and heating). Over a 20 year period the natural ventilation system is 5 times cheaper than the mechanical system. The mixed mode system is 2.5 times cheaper than the mecahnical system.

Based on the energy calculations by the Fraunhofer IBP it was found that natural and mixed mode ventilation reduce the energy, CO_2 emissions and Life Cycle Cost compared to a mechanical system. Each of the two systems has pros and cons and WindowMaster can help you choose the optimal system that fits your purpose/building.

Contact WindowMaster for further details about the report contents and calculations.

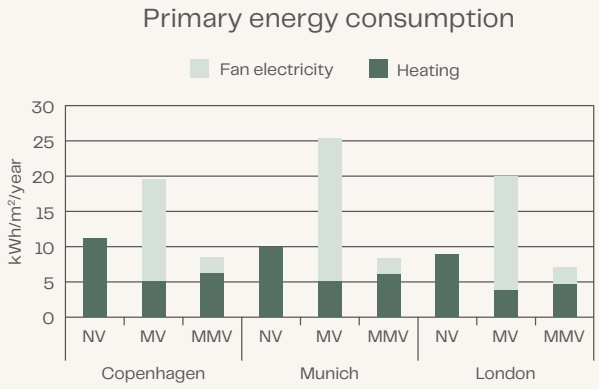


Figure 1: Data based on Fraunhofer IBP calculations and assumptions

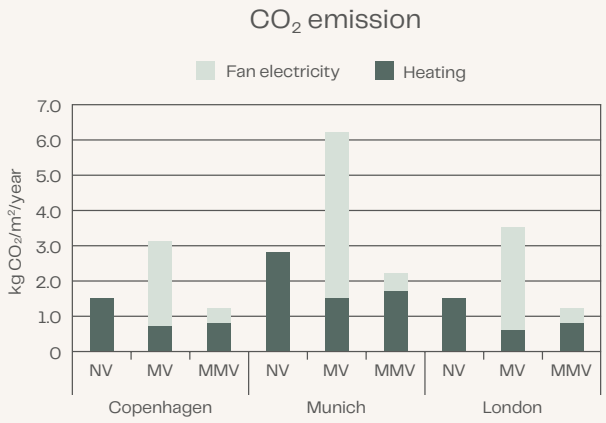


Figure 2: Calculations of CO_2 values carried out by WindowMaster

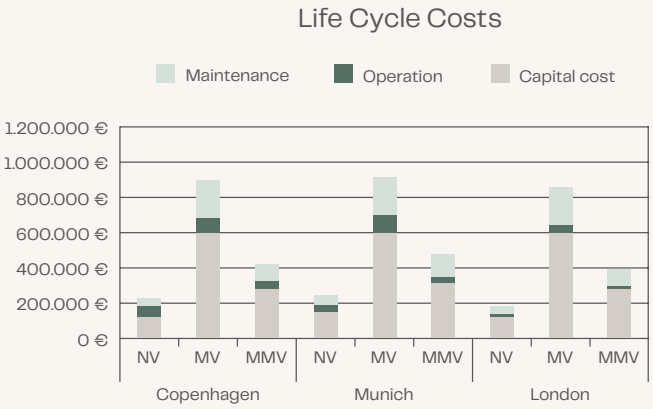


Figure 3: Calculations of Life Cycle Cost carried out by WindowMaster

1. Fraunhofer IBP report no RK 013/2012/295
2. WindowMaster has calculated the energy performance for the mixed mode ventilation based upon improvements suggested by Fraunhofer IBP.

System example

NV Advance® comprises a range of standard components that can be used individually in any project. Example of a solution for one zone with natural ventilation combined with smoke ventilation are shown below

1. Server-PC
A centrally located server-PC ensures that the whole NV Advance® solution is gathered in one place and gives the user access to monitoring and adjustment of the system.

2. Climate screen
The optional touch screen is fitted on the wall to give the user access to data from the whole building or selected zones. Information about the indoor and outdoor climate as well as energy can be displayed.

3. System panel
The system panel for NV Advance® contains bus components and works as the interface to the server-PC. The system panel is available in different sizes depending on the number of climate zones.

4. Weather station
A weather station placed strategically on the outside of the building collects climate information on temperature, humidity, wind speed and direction.

5. Actuators
Our actuators are available in a wide range of models and sizes and can in some cases be concealed in the window profile. The product catalogue contains both chain and spindle actuators with a stroke of 100–1000 mm which can be programmed for each window. The actuators include the MotorLink® technology.

6. Controls – comfort ventilation
The window actuators open and close automatically with millimetre precision via a signal from the MotorController which uses the unique MotorLink® technology. The controller is available in various models for different numbers of motor lines.

7. Controls – smoke ventilation
WindowMasters smoke control panels can control the combination of comfort and smoke ventilation. Small and medium sized buildings use compact panels, while the modular panels are designed for larger buildings. Both types can be configured into master-/slave-combinations.

8. Sensors
Each climate zone has a sensor measuring the room temperature, CO_2 level and humidity to ensure that the indoor climate is continuously regulated. A PIR detector can also be installed so that the system is able to register any activity in the zone.

9. Keypads
A keypad (switch) on the wall enables the user to temporary override the system manually, e.g. to open/close the windows. The keypads can also be linked to other functions such as sun screening.

10. Accessories
WindowMaster also supplies various optional extras for the system such as components for heating control, mechanical ventilation and sun screening.

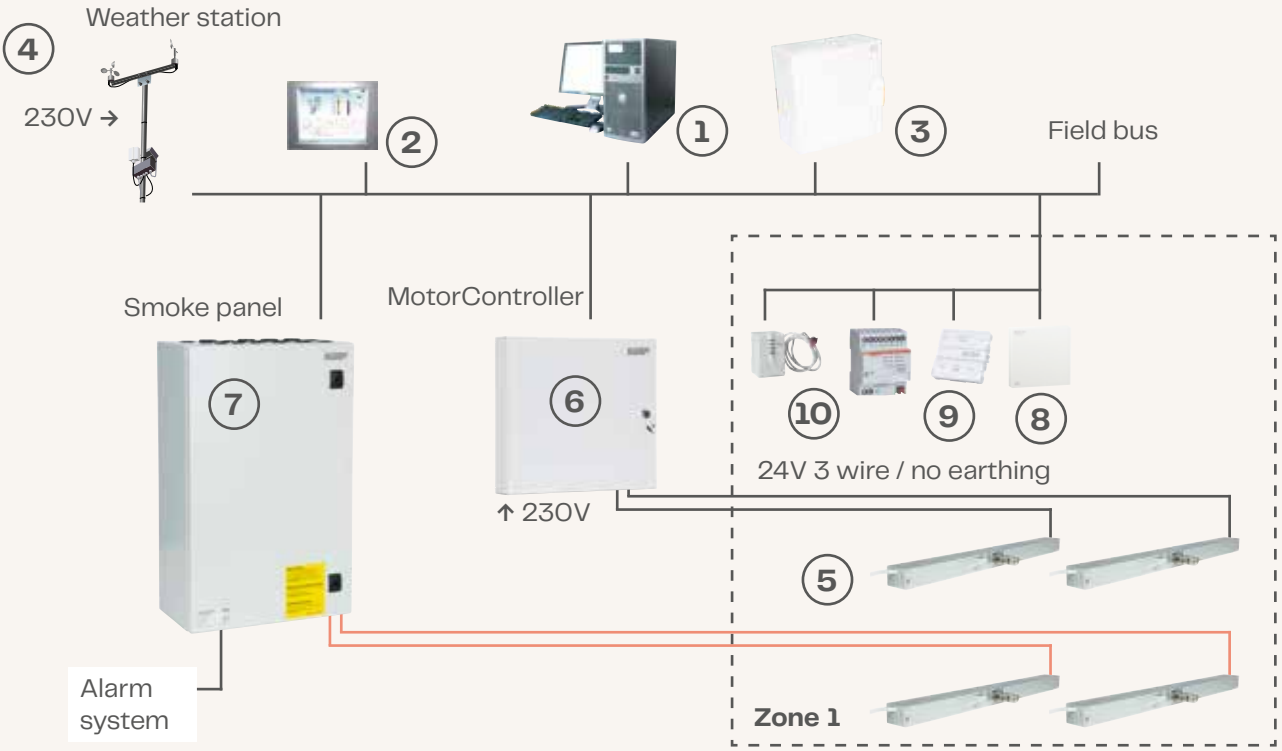

4
Weather station
230V →
2
1
3
Field bus
Smoke panel
MotorController
7
6
10
9
8
24V 3 wire / no earthing
↑ 230V
5
Alarm system
Zone 1

Photo: Fotomedie Moesgaard, Rõgvi N. Johansen

From concept and detailed design to project completion and beyond

Extensive know-how is the basis for offering a premium system for natural ventilation. WindowMaster supplies high-quality solutions for natural ventilation by combining the extensive knowledge of natural ventilation with many years experience in window automation and facade technology. WindowMaster works in close partnership with the customer to identify the best technical and cost-effective solution

Your partner throughout the process

Design and project planning

WindowMaster provides consultancy services and support – from the architect's very first drawing to installation and operation. Our consultants detail the proposed solutions which are always tailored to each project to visualise the air change rates possible with natural ventilation.

Our consultants are able to help with:

- Assessment of projects in the planning phase
- Proposals for complete solutions
- Indoor climate and CFD calculations
- Facade and skylight design
- Dimensioning of openings for smoke and natural ventilation
- Turnkey solutions

The solution

NV Advance® has been developed on the basis of partnerships with recognised research institutes and practical experience from a wide range of construction projects. By monitoring climatic conditions both externally and internally (including temperature, CO_2, humidity and wind), the system adjusts the indoor climate automatically by quietly, safely and accurately opening and closing windows by precise incremental amounts. The building is divided into climate zones which are controlled and monitored individually by the control system to ensure that the climate in each zone can be adjusted as required. This advanced system contains a wide range of options and can be installed using:

- Natural ventilation
- Smoke ventilation
- Mixed mode ventilation
- Night cooling
- Sun shades
- Heating systems
- Cooling systems
- Automatic window openers
- Project-adapted control system

Implementation

WindowMaster is happy to manage the installation and commissioning of the NV Advance® solution – either using our own skilled engineers or one of our highly trained partners. We assist with the setting of the system's many parameters, carry out a complete initialisation and issue operational and maintenance documentation.

We can assist with design support across disciplines, and when delivering a complete turnkey package WindowMaster will manage the project right up to handing over the finished solution to the customer with clear instructions for operation. And with single source supply, there's time saved on coordinating between suppliers as well as the reassurance that the products are perfectly matched to interact smoothly.

Our engineers are able to help with e.g.:

- Simulations
- Installation
- Commissioning and testing
- Handover, user training and instruction

Follow-up and service

WindowMaster's natural ventilation systems have been developed to function reliably year after year. But components, such as actuators, power supplies, controllers and above all, the interaction between window openers and window fixtures should be regularly inspected. This is why we are available for regular service visits and repairs. We also offer service agreements tailored to the customer's requirements. All service agreements include a telephone hotline that ensures fast support during office hours.

- Service, maintenance and functional testing of components
- Software maintenance and updates
- Remote service, system changes, fault identification and backup
- Regular monitoring and adjustment
- Event logging
- Indoor climate support with optimisation recommendations

St. Wilfrid‘s Catholic School

St. Wilfrid’s secondary school moved in May 2009 into a new school building located in Crawley, West Sussex. The total floor area is 8.000m^2 and the school is designed for 1.000 pupils. Classrooms, offices, sports hall, shared areas etc. are ventilated by natural ventilation – a total area of approximately 5.800m^2.

The natural ventilation is provided through automatically operated façade windows placed at high level in each room and through vertical stacks and Windcatchers mounted on the roof. In each room, close to the automatically operated windows, there is a manual keypad allowing the teachers and pupils to override the control of the windows in the façade.

Building type
School

Architect
Curl la Tourelle Architects

Solution
NV Advance® to control natural ventilation

Wexford County Council

This new building comprises six open-plan departmental blocks with an outer layer of glass, which acts as the outer skin of a double façade. This provides protection but also regulates the interior temperature through the control of air around the building; cooling the building in the summer and creating an insulating layer during the winter. The natural ventilation through the double skin facade is provided via a trench at ground level and glazed louvres at high level with MotorLink® actuators.

The internal facade contains automated top hung windows, and two rooflight sections are placed above the reception area. The NV Advance® system controls the climate in 99 individual zones and interfaces to windcatchers, mechanical ventilation and the heating system, as well as the windows, rooflights and louvres.

Building type

Office

Architect

Robin Lee Architecture and Arthur Gibney & Partners

Solution

Natural and mixed mode ventilation

WindowMaster aspires to protect people and the environment by creating a healthy and safe indoor climate, automatically ventilating spaces with fresh air through facade and roof windows in commercial buildings. We offer the construction industry foresighted, flexible and intelligent window actuators and control systems for natural ventilation, mixed mode ventilation and smoke ventilation – of the highest quality.

WindowMaster employs highly experienced cleantech specialists in Denmark, Norway, Germany, United Kingdom, Ireland, Switzerland and United States of America. In addition, we work with a vast network of certified partners. With our extensive expertise built up since 1990, WindowMaster is ready to help the construction industry meet its green obligations and achieve their architectural and technical ambitions.

NV Advance® is an advanced and flexible indoor climate solution that can be customised for any building and user. Using natural ventilation and a precise control strategy, the system ensures a stable and comfortable indoor climate – even in large buildings with multiple climate zones.

windowmaster.com

WINDOW Master®
Fresh Air. Fresh People.