

The VELUX logo consists of the word "VELUX" in a bold, white, sans-serif font, with a registered trademark symbol (®) to its upper right. The text is set against a solid red rectangular background.

**VELUX®**

The word "Commercial" is written in a white, sans-serif font on a solid black rectangular background.

**Commercial**

The background of the entire page is a photograph of a modern architectural interior. It features a series of white, curved, cantilevered balconies or walkways that create a rhythmic pattern of light and shadow. The lighting is soft and directional, highlighting the textures of the concrete and the play of light on the surfaces.

DESIGNING  
WITH **DAYLIGHT**

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# DAYLIGHT DESIGN GUIDE

## **Transforming spaces with daylight and ventilation through the roof**

A roof has more purpose than simply keeping the rain out – it presents a unique opportunity to bring in daylight. Daylight through the roof can transform a space like no other façade.

The introduction of daylight and fresh air allows people to enjoy a room – any room, all year-round. Students learn better in schools and office employees are more productive at work with fewer days of absence.

Rooflights improve an indoor climate, while also helping to reduce energy consumption and carbon footprints. If we replace mechanical ventilation with fresh air through the roof and artificial lightning with daylight, it's to the benefit of both people, and planet.

VELUX Commercial designs and manufactures daylight and ventilation solutions for industrial, commercial, and public buildings.

In our design guide, we hope to encourage and inspire you to design buildings, where generous levels of daylight and fresh air is used to transform spaces into favourite places.

**Enjoy the read!**

**Anna Spring**

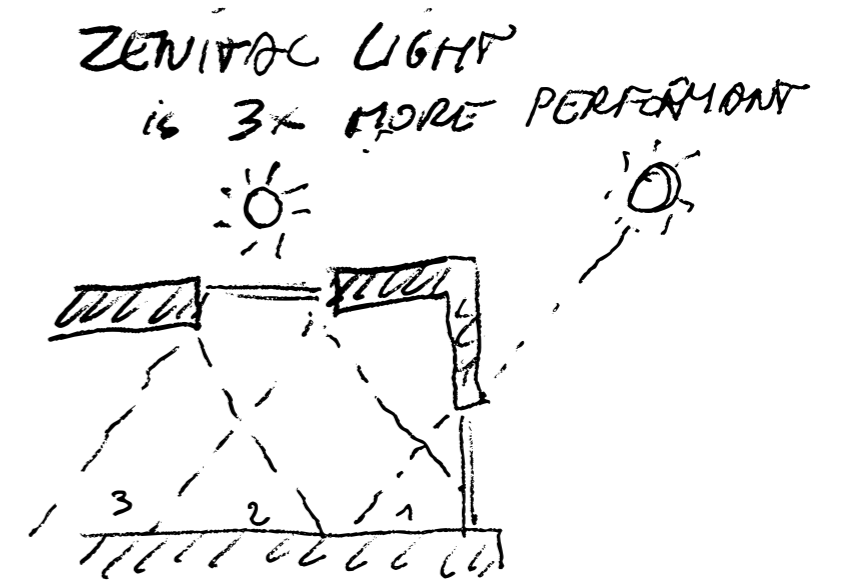
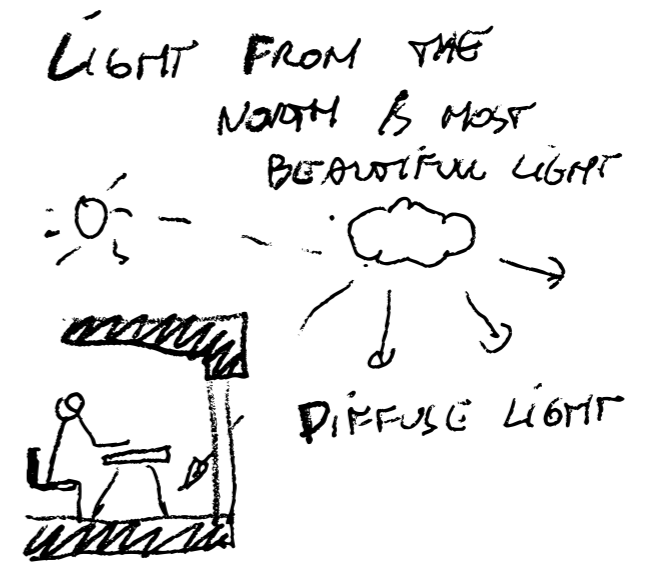
Senior Vice President, VELUX Commercial

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## Daylight and natural ventilation solutions for working, learning and shopping

On average, people are now spending up to 90% of their time indoors.

Daylight and fresh air are playing increasingly important roles in architectural design choices. The positive impact of this includes improved well-being with productivity being increased by employees by as much as 15%.

Rooflights also play a central role in removing unwanted smoke and toxins from a building in the event of a fire or spillage. When using rooflights, energy consumption caused by artificial lighting can also be reduced by as much as 50% in some commercial buildings.

But many commercial buildings are not incorporating daylight solutions into their project design plans. Part of the reason is that building owners and decision makers are not aware that simple and functional daylight solutions exist, allowing fresh air and natural light to transform spaces benefitting people and the planet.



# Daylight and ventilation facts and figures

There is a 15% increase in productivity and the learning development of students when offices and schools have access to plenty of daylight and fresh air.

(Source: World Green Building Council 2013)

↑ +15%

19% of global energy consumption comes from electric lighting. Daylight solutions can reduce electricity consumption by as much as 50%.

(Source: International Energy Agency SHC Task 61)

↓ -50%

Commercial buildings use 15-20% of the worlds' energy consumption.

(Source: Sustainable Workplaces for Human Health and Productivity, FAIA, 2019)

→ 20%

There is a 10% decrease in employee performance when temperatures are too high or low.

(Source: Seppänen, O., W.J. Fisk, and Q.H. Lei 2006)

↓ -10%

Daylight and comfort ventilation combined with heat control prevents glare and direct sun exposure, offering unique possibilities to create healthy, comfortable and more productive indoor spaces.

(Source: Healthy Home Barometer 2016-19)

People spend about 90% of their time indoors.

(Source: International Energy Agency SHC Task 61)

→ 90%

47% of office workers have no natural light in their working environment.

(Source: Human Spaces 2015)

→ 47%

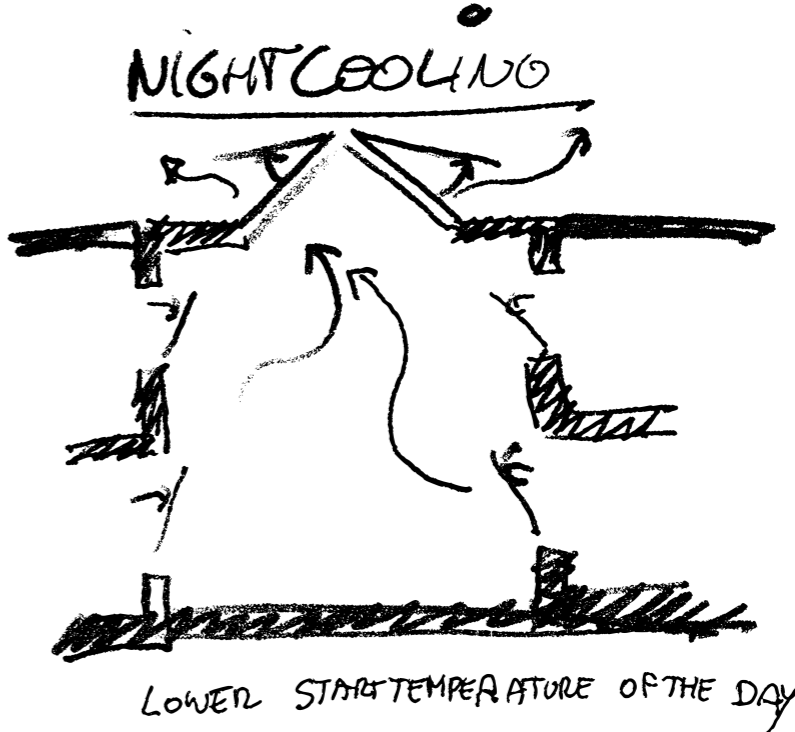
Natural ventilation can reduce air-conditioning and energy consumption by 30-50%.

(Source: CE classifications according to EN Standard)

↓ -50%







# Creating a healthy environment and sustainable future

Sustainable buildings can have a positive impact on both people and the planet. A core purpose of VELUX Commercial is to contribute to a better indoor climate that improves well-being, as well as helping to reduce energy consumption through the introduction of daylight in commercial building spaces.

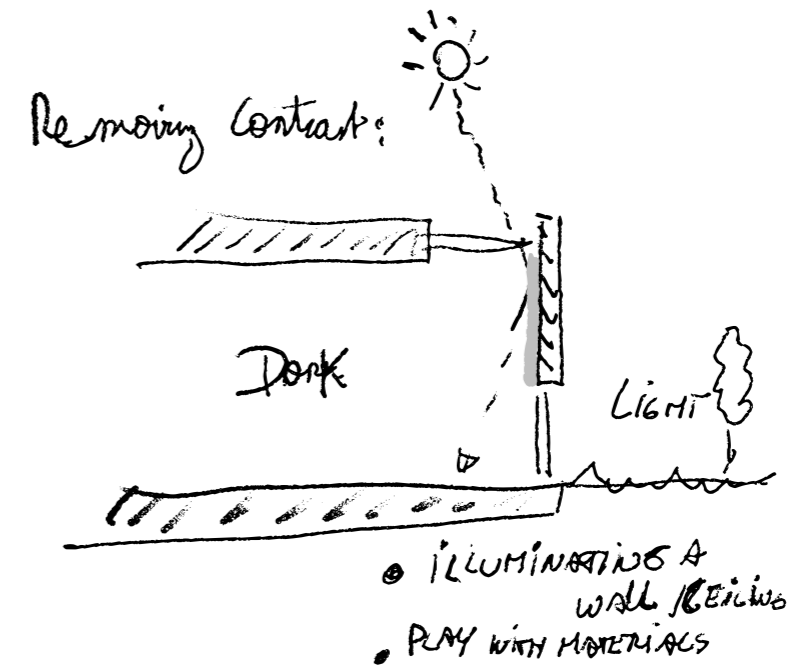
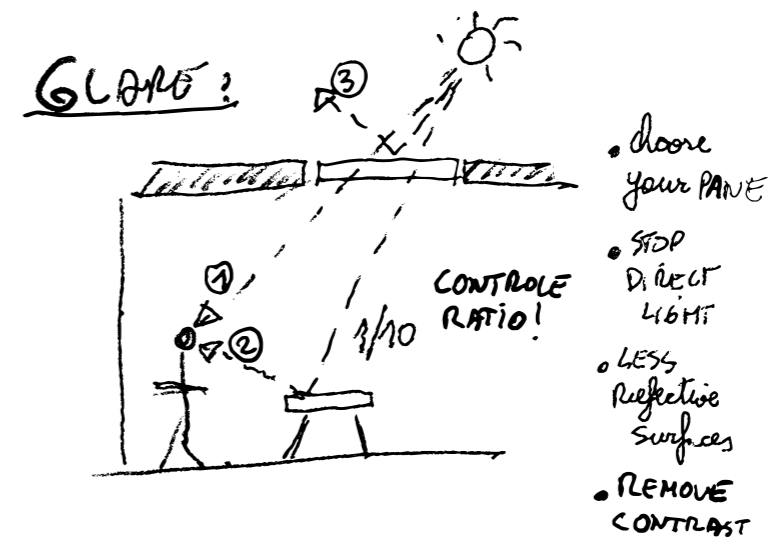
Natural ventilation also plays an important role in sustainable approaches to design. Not only does it provide additional comfort to people with unwanted toxins able to be removed from a building space, but a reliance on air conditioning is also reduced when rooflights are able to provide fresh air as an alternative cooling option.







SUSTAINABLE  
BUILDING  
CERTIFICATES



## Valuing sustainable certification

### **Why certification matters**

When a building receives a sustainable certification, this further illustrates the important role sustainability plays in the design phase; the key components of a project can be prioritized when looking to improve the quality of a building.

Daylight and natural ventilation play an important role in sustainable design, helping to make energy usage more cost efficient, while also improving the wellbeing of building occupants. Our daylight and ventilation solutions can be incorporated into certification schemes and contribute to a healthier indoor climate for people and the environment.

### **Sustainability can lead to certification**

Sustainability is a fundamental part of our business model. We continuously seek to minimise our footprint and wish to lead in the development of healthy and sustainable buildings, in close communication with designers and planners in the building sector.



# Overview of sustainable building certificates

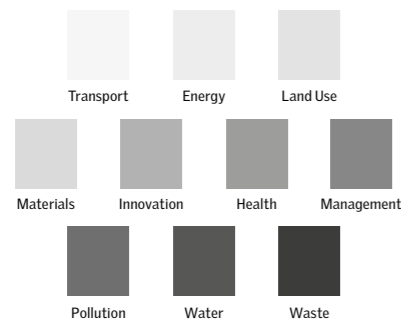
Eight of the most common planning tools and their respective structures pursue a holistic strategy that encompasses energy and other environmental issues, as well as indoor climates. Life cycle costing also plays a role in the DGNB systems.

The WELL Building Standard focuses only on aspects of health and well-being. Most schemes offer several levels of certification (such as Silver, Gold and Platinum) whereas others, such as Active House, put a stronger emphasis on planning guidance.

## BREEAM

Initiated by	BRE (Building Research Establishment) Group
Year	1990
Website	www.breeam.com

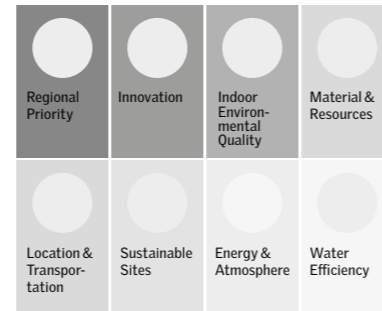
Structure



## LEED

Initiated by	U. S. Green Building Council
Year	1999
Website	www.usgbc.org

Structure



## THE LIVING BUILDING CHALLENGE

Initiated by	International Living Future Institute
Year	2006
Website	www.living-future.org

Structure



## DGNB

Initiated by	German Sustainable Building Council (Deutsche Gesellschaft für Nachhaltiges Bauen/DGNB)
Year	2008
Website	www.dgnb.de

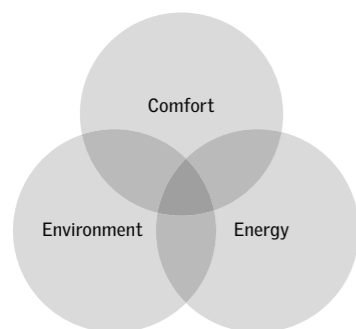
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## ACTIVE HOUSE

Initiated by	Active House Alliance
Year	2012
Website	www.activehouse.info

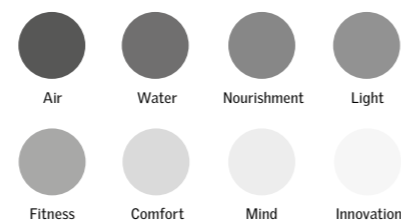
Structure



## WELL BUILDING STANDARD

Initiated by	International WELL Building Institute (IWBI) and Delos Living LLC
Year	2014
Website	www.wellcertified.com

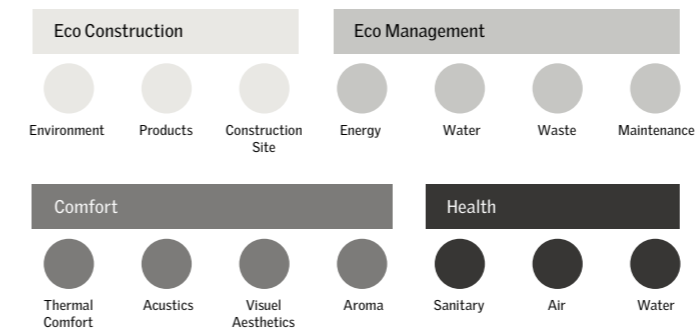
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## HQE

Initiated by	Haute Qualité Environnementale (HQE)
Year	1995
Website	www.behqe.com

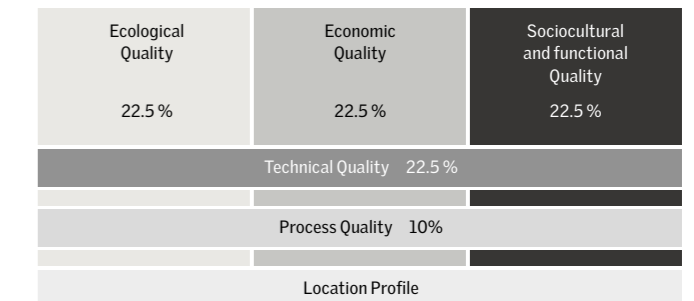
Structure



## BNB

Initiated by	Assessment System for Sustainable Building (BNB) (In association with DGNB and BBSR)
Year	2015
Website	www.bnb-nachhaltigesbauen.de

Structure





## Pushing sustainability boundaries with certification

### **Contributing to an excellent indoor climate**

Certifications help shift industry perspectives, driving change by formalising design and performance criteria so that what was once considered innovative becomes common. The process of evolving certification tools forces stakeholders to raise green building standards in response to new factors such as the Paris Agreement.

Certification is also successful in raising the awareness of sustainability within the building industry. The following is a range of certified buildings in which VELUX Commercial contributed to the excellent indoor climate, helping them achieve outstanding ratings and classifications.





**Green Solution House**  
Rønne, Denmark

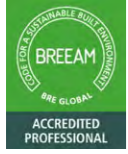
Achievement: DGNB and Active House



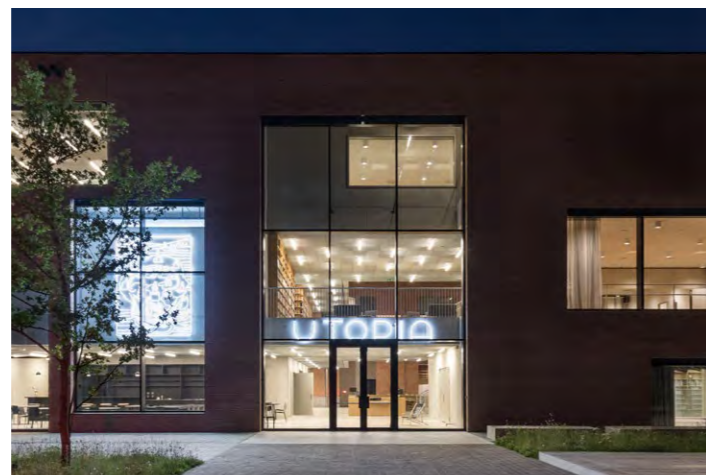
At Green Solution House, every component in the building contributes to circular sustainability. Daylight plays an important role in the ambitious sustainability strategy of the hotel and conference centre.

**Utopia Library**  
Aalst, Belgium

Achievement: BREEAM Excellent



Light and fresh air make visitors forget all about old and dusty libraries. A former military school has been transformed into a modern city library and performing arts academy.



DZNE,  
German Centre for Neurodegenerative Diseases  
Bonn, Germany

Achievement: BNB Gold



Creating a bright and inspiring  
research environment.

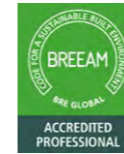
When planning its new head-  
quarters, the DZNE research  
centre went for a building that  
would reflect its ground-breaking  
research and provide a healthy  
indoor climate.





**Trumpington College**  
Cambridge, United Kingdom

Achievement: BREEAM Excellent



The college wanted to create a level of transparency that would give students and staff the benefit of daylight as well as a glimpse of the weather outside, while preventing glare and high contrast ratios.



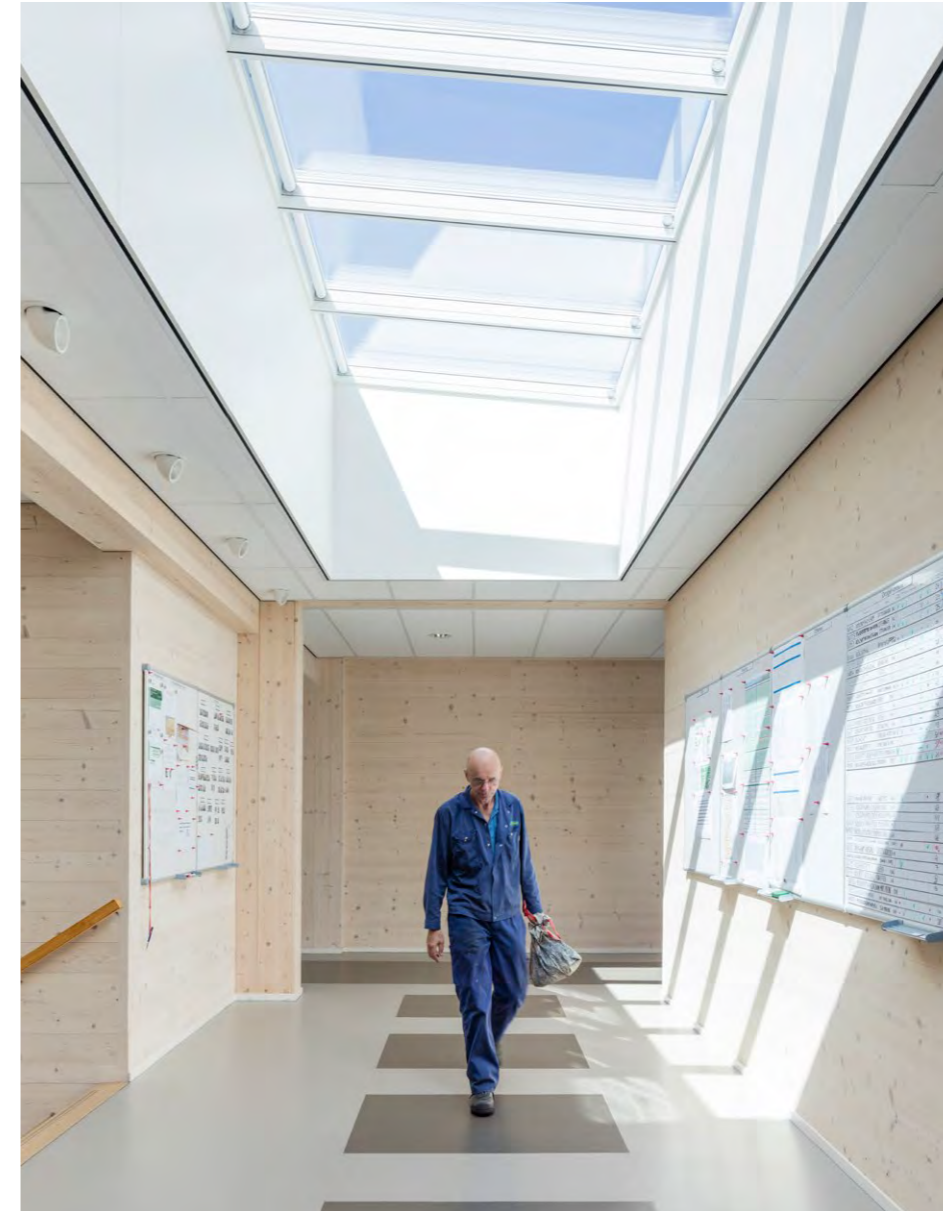


**Siemens Head Office**  
Ballerup, Denmark

Achievement: LEED Gold



When building a new head office in Denmark, Siemens wanted to take advantage of the latest technologies to create a bright and productive office environment.



**Geelen Counterflow**  
Haelen, The Netherlands

Achievement: BREEAM Outstanding

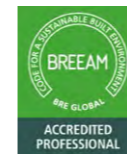


When expanding their headquarters, Geelen Counterflow were looking for a highly sustainable solution that was in line with cradle-to-cradle design principles. They chose a prefabricated construction that can be dismantled and recycled at the end of its life.



**Genmab**  
Utrecht, The Netherlands

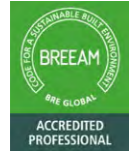
Achievement: BREEAM Excellent



The research facility of international biotechnology company Genmab has a meticulous focus on design, functionality and sustainability.

**Energy Transition Company**  
The Netherlands

Achievement: BREEAM Excellent



The focal points of this building's renovation are sustainability, energy-efficiency and usability.

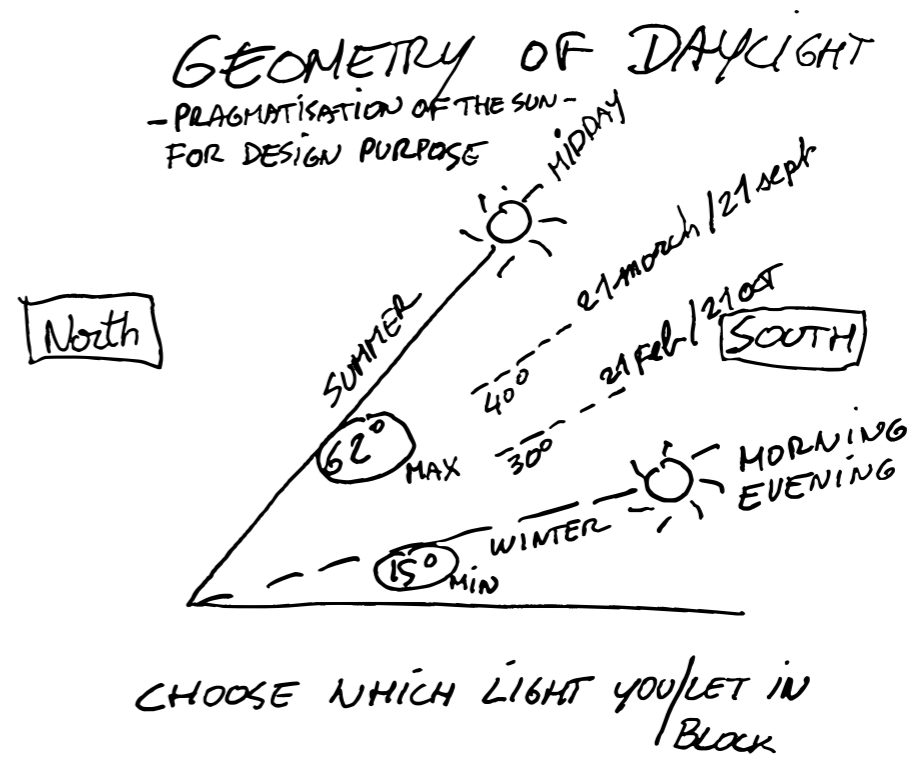
To reach a zero-energy performance coefficient, photovoltaic cells (PV) have been placed on the roof to fulfil the remaining energy demand.







DESIGNING WITH  
DAYLIGHT AND  
NATURAL VENTILATION



## EN 17037

### **Daylighting in buildings and the importance of EN 17037**

In reaction to scattered European daylight legislations, the EN 17037 was introduced.

European Standard EN 17037 was published in 2018 with the aim of helping building designers achieve appropriate levels of daylight in any type of building, making them future proof.

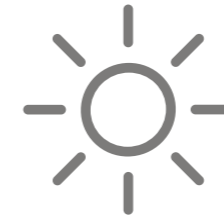
The intent of EN 17037 is to change the focus of building design and the role of glazing in those designs to improve occupant comfort and overall energy efficiency. The need to provide glazed openings and well-distributed daylight to interior spaces, while reducing artificial lighting usage should be considered against the balance between heat loss and solar gains.





## WHAT ASPECTS OF DAYLIGHT DESIGN DOES THIS STANDARD COVER?

Although written for new buildings, EN 17037 provisions can also be applied to works undertaken on existing buildings. Some designers may have familiarity with designing to provide daylight, but the other three aspects of design significantly extend the scope of the standard compared to existing best practice.



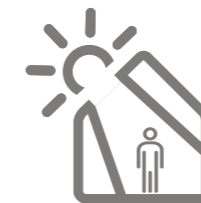
### Daylight provision

Daylight provision or illuminance levels allow users to carry out tasks and play a part in determining the likelihood of artificial lighting being switched on. Assessment can be via either climate-based modelling or daylight factor calculations.



### Assessment of window view

Building users should have a large, clear view of the outside. EN 17037 considers the width and outside distance of the view, as well as landscape 'layers' (sky, landscape and ground). The view should be perceived to be clear, undistorted and neutrally coloured. Width of view can be established via a detailed or simplified approach. Outside distance and number of layers are each measured by a single approach.



### Access to sunlight

Calculating access or exposure to sunlight is a comfort and health factor for users of dwellings, nurseries and hospital wards. Daily sunlight exposure can be established through detailed calculation or table values.



### Prevention of glare

As the name suggests, prevention of glare is concerned with removing the probability of glare for building users, especially those who do not choose where they sit. It uses detailed calculations of daylight glare probability (DGP), or a standard table of values for sun-screening materials.

# Designing with daylight and natural ventilation

**Improving well-being and comfort**  
With people spending up to 90% of their time indoors, designing with daylight becomes increasingly important if wishing to improve well-being. Innovative daylight design connects the inside of buildings to the world outside. Natural light helps stimulate the mind and creates comfortable environments for work, study and leisure. When thermal control is combined with natural light and fresh air, comfort and well-being is maximised.

**Daylight and ventilation with additional comfort features**  
VELUX Commercial offers several unique features to help create great daylight designs. The availability of roller blinds, awnings and opening modules for ventilation help reduce heat and glare exposure, as well as providing climate control.





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## FIVE CONSIDERATIONS WHEN DESIGNING BUILDINGS WITH DAYLIGHT AND NATURAL VENTILATION

### **Optimize daylight**

Maximize windows and rooflights and consider the size, shape and angle of the roof, as well as orientation of the building.

### **Utilize ventilation modules to provide comfort**

Ventilation removes toxins and replaces them with fresh air.

### **Choose a seamless solution for maximum daylight and transparency**

Rooflight designs with smooth interior linings and discreet profiles can eliminate shadows.

### **Use sun screening blinds and/or awnings**

Block glare and heat from the sun.

### **Prevent glare and direct sunlight exposure**

Fritted and opal glazing divert sunrays, bounce heat and let in lots of daylight.

## Ventilation and better indoor air quality

### Why indoor air quality is important and how to improve it

Indoor air quality is generally a product of two factors: pollutants generated indoors and the levels of pollution in outdoor air surrounding the building. Indoor air with high levels of pollutants can cause general discomfort and a range of negative health effects, including irritation of the eyes, nose and throat.

Good indoor air quality creates a sense of comfort and well-being. The pleasant sensation of pollution-free air, as well as its positive effects can be felt immediately when a person enters a room. Clean air can improve general well-being and mental performance.

A recent study<sup>1</sup> conducted to improve ventilation in 16 classrooms demonstrated how high-quality indoor air improves the learning progress of students. Computerised tasks performed by more than 200 students showed "significantly faster and more accurate responses for choice reaction, colour word vigilance, picture memory and word recognition, at higher ventilation rates"<sup>1</sup>.

### CO<sub>2</sub> as a key indicator

We now know that indoor air quality affects both health and performance. But which indicator for indoor air quality is generally used in schools and other learning environments?

CO<sub>2</sub> – carbon dioxide – is the most relevant indicator for indoor air quality as it relates to people, whether in homes, offices or schools. CO<sub>2</sub> is measured in parts per million (ppm).

Indoor levels rise as a result of human activity and can only be lowered through ventilation. The more CO<sub>2</sub> that is present in a room the more pollutants you are likely to experience overall.

### What constitutes good air quality?

Outdoor CO<sub>2</sub> levels are approximately 400 ppm. Because breathing generates CO<sub>2</sub> indoor air will always have a higher concentration when people are present.

A CO<sub>2</sub> level of up to around 1,150 ppm is considered good air quality. 1,400 ppm will be acceptable in most situations, although not for prolonged periods. CO<sub>2</sub> levels above 1,600 ppm indicate lower air quality, and exposure time above this level should be minimised. With our key indicator in place, it's time to look at how designers and architects can improve air quality in buildings.

<sup>1</sup> Bakó-Biró, Z., D. J. Clements-Croome, N. Kochhar, et al. (2012). "Ventilation rates in schools and pupils' performance." *Building and Environment* 48 (O): 215-223.



## Combining mechanical and natural ventilation to create a healthy indoor climate

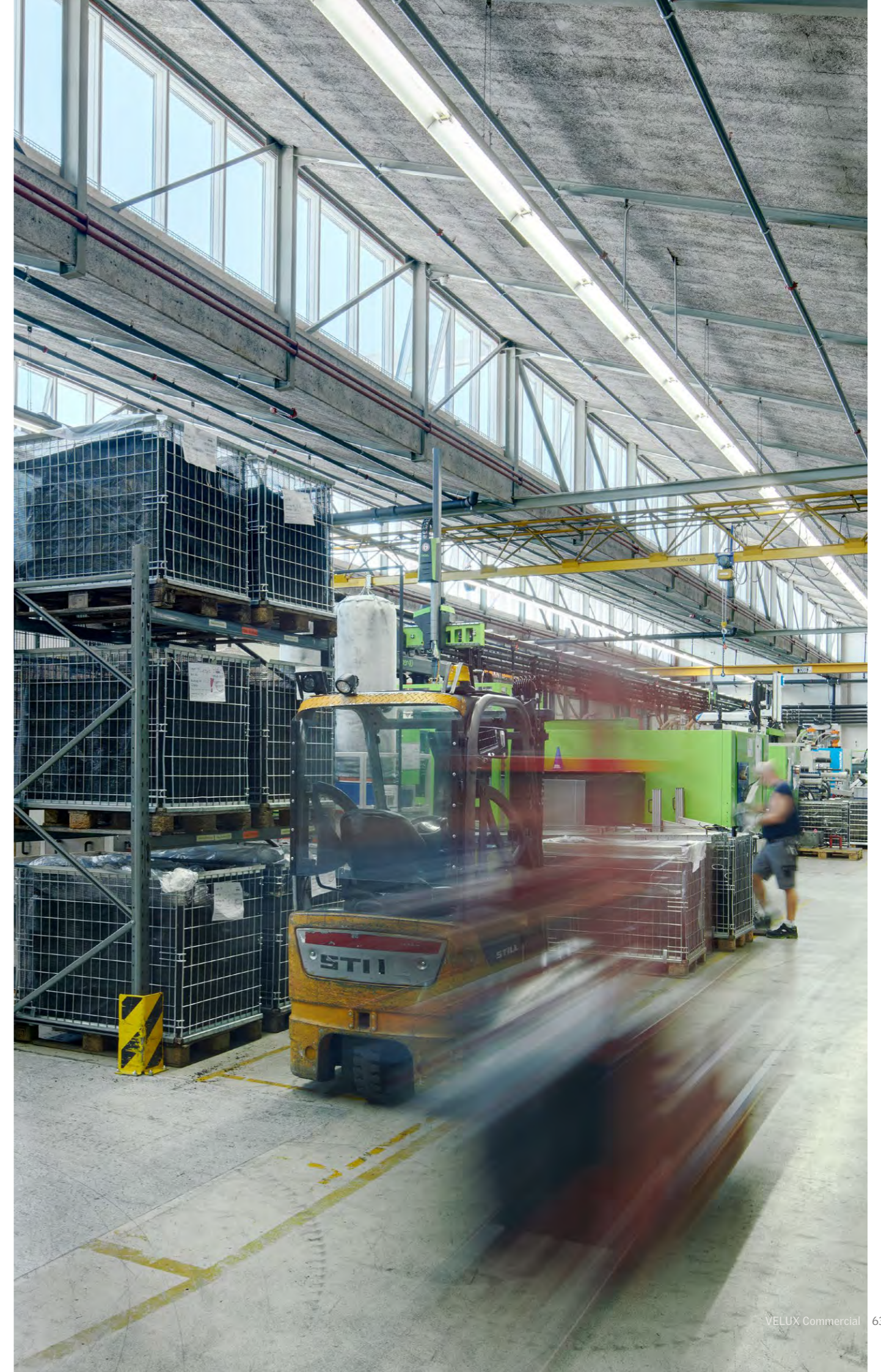
Mechanical and natural ventilation systems work together to improve indoor climates and help reduce potential exposure to viruses and toxins. Mechanical systems create a constant hygienic air change rate while natural ventilation provides the additional climate change required to dilute air sufficiently, for example, when spaces are being used for longer than normal by building occupants.

Natural ventilation uses wind and buoyancy to provide fresh air in buildings and can be used as both background ventilation and to quickly fill a space with fresh air. Providing operable windows gives system users more control and is a simple way to achieve high ventilation rates. Natural ventilation also provides a building with additional air-cooling capabilities in hotter summer months.

Mechanically controlled ventilation is independent from evolving weather conditions such as high or low winds, making it easier to control an indoor climate and maintain temperatures. The ventilation rate also remains unaffected when there's an absence of building occupants.

### Strengths and Weaknesses of Natural and Mechanical Ventilation

	Natural ventilation (natural supply and exhaust)	Mechanical ventilation (mechanical supply and exhaust)
<b>Strengths</b>	<ul style="list-style-type: none"> <li>✓ Very high air change rates can be achieved by airing.</li> <li>✓ Due to ventilative cooling extra ventilation is stimulated in summer.</li> <li>✓ Room air cleaners with HEPA filter can be used.</li> <li>✓ Easy to understand; direct user feedback and personal control.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ventilation rate is independent from wind conditions and outdoor temperature.</li> <li>✓ Ventilation can be maintained during absence without safety consequences.</li> <li>✓ Direction of air flow is clear.</li> <li>✓ Room air cleaners with HEPA filter can be used.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>✗ Ventilation rate depends on user behaviour.</li> <li>✗ Ventilation rate depends on outdoor conditions (e.g. weather, traffic noise).</li> <li>✗ Use of ventilation facilities depend on the building design (usability, safety).</li> <li>✗ Direction of air flow depends on indoor and outdoor conditions.</li> </ul>	<ul style="list-style-type: none"> <li>✗ Increasing the air change rate by airing is not possible.</li> <li>✗ If centralized air handling units are equipped with a recirculation sector, virus particles can re-enter the building.</li> <li>✗ No user feedback from mechanical ventilation.</li> </ul>





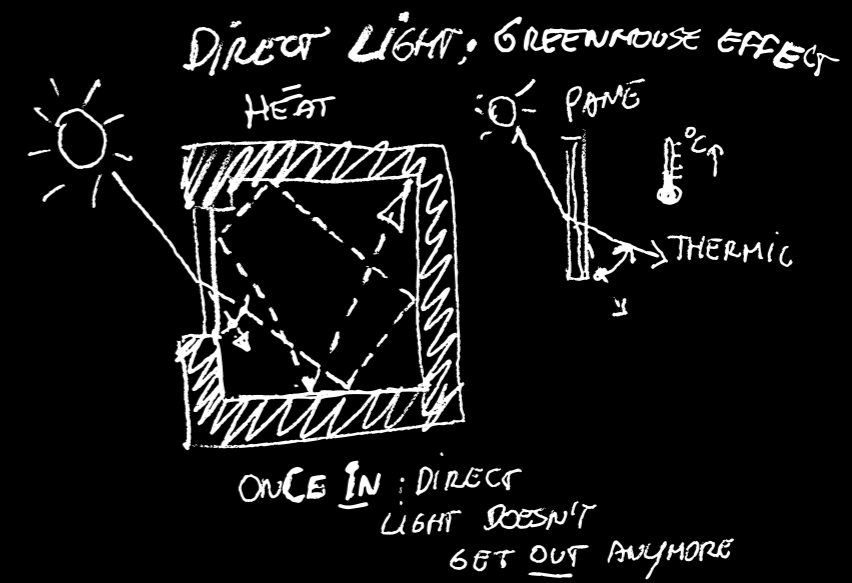
## Smoke and heat exhaust ventilation in the event of a fire

Smoke and heat exhaust ventilation (SHEV) is a critical part of commercial building design. Daylight solutions can be specified with SHEV solutions to offer additional safety support in the event of a fire. Our rooflights can be configured to open automatically, removing toxic smoke from a building, and reducing heat exposure to a building's infrastructure. The removal of smoke also assists in helping people leave a building more quickly, while a reduction of heat protects against a potential building collapse.

Smoke and heat exhaust ventilation solutions are designed in accordance with EN 12101. SHEV solutions are tested and regulated to ensure they perform optimally in the event of a fire. Both pneumatical and electrical options are available when choosing a rooflight with smoke and heat exhaust ventilation capabilities, and these designs can be easily incorporated into project planning.







⇒ AVOID DIRECT LIGHT:

- USE YOUR ARCHITECTURAL SHELL!  
TO DO SO: LOW TECH
- VENTILATE IF YOU CAN'T PREVENT  
DIRECT LIGHT

## Adding daylight to your design plans

### **Incorporating daylight into building design to transform spaces**

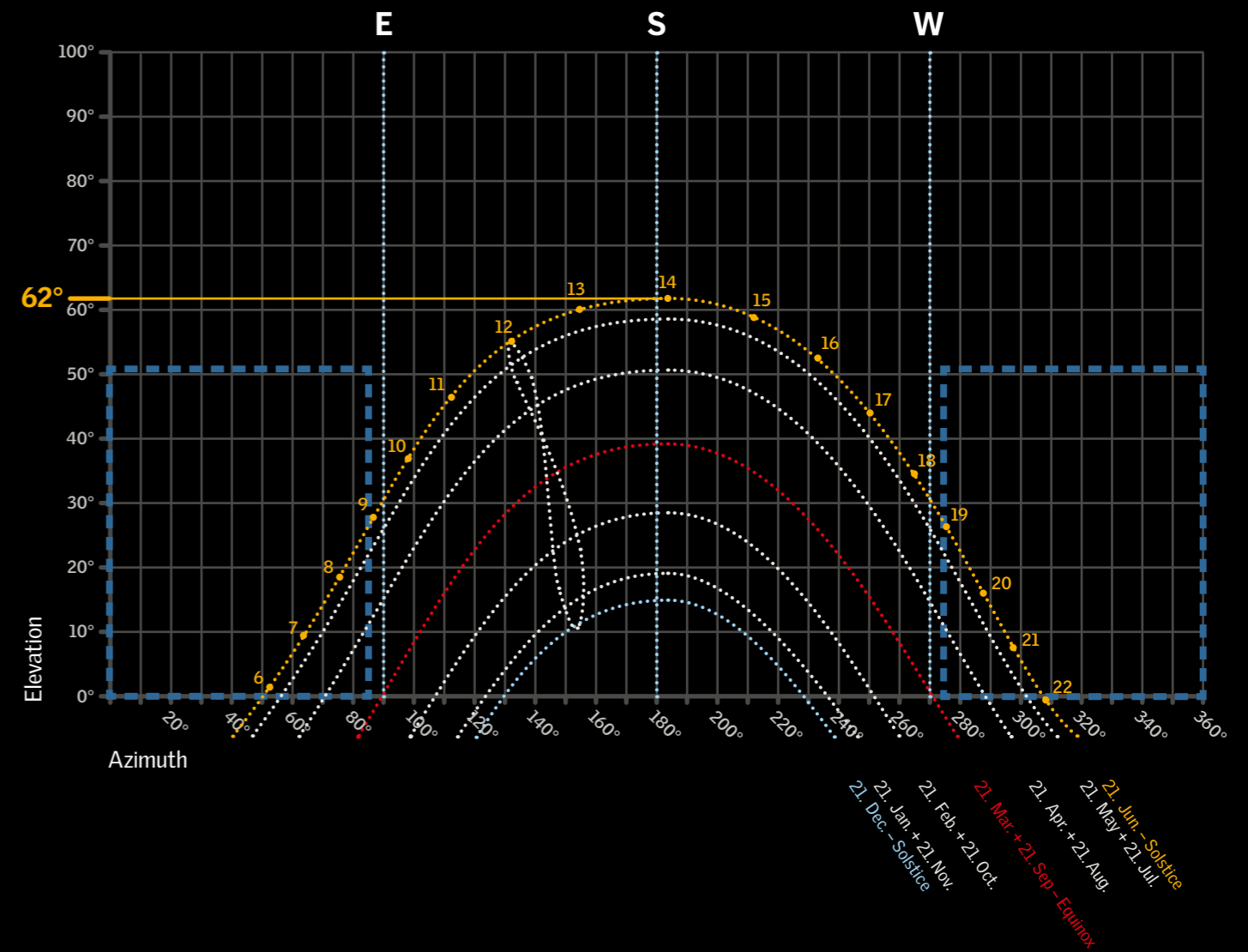
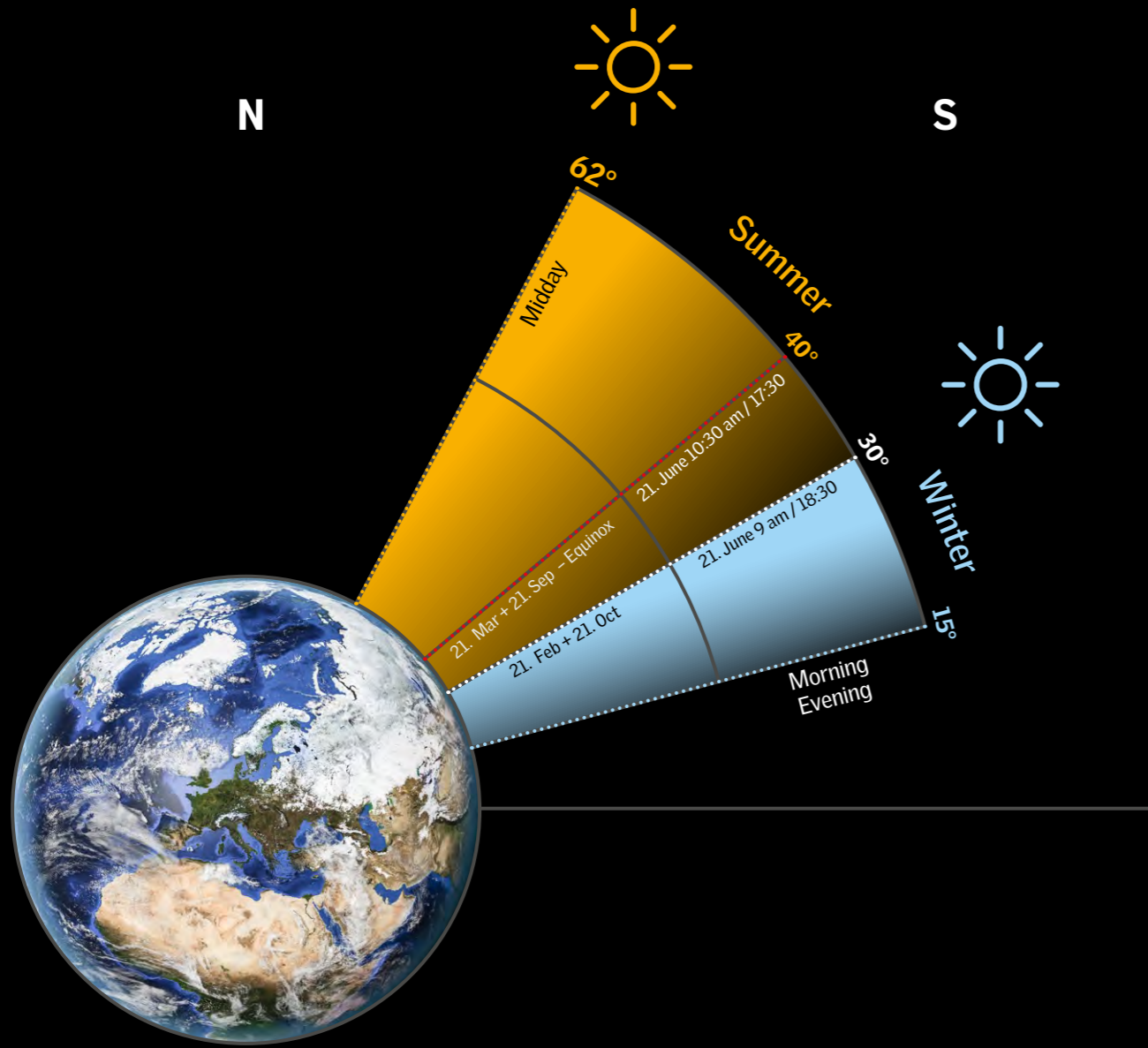
Architects face challenges to create user-friendly, efficient building spaces, which may mean daylight is not a priority in design specifications. However, if embraced and incorporated into designs there are several positives.

- Save on energy usage
- Reduce glare
- Avoid overheating



# Understanding how daylight enters a building

Understanding the way daylight enters a building at different times of the year can lead to building designs that optimize the use of daylight.



In summer, light can increase to 62 degrees in certain countries, and understanding this will influence architectural design plans. Glare and overheating are additional challenges that can be overcome with a considered approach and a deeper knowledge of solutions such as diffuse lighting.

In winter, the increase of light is reduced by as much as 15 degrees in certain countries, meaning light enters building spaces gradually and with much less risk to exposure or glare.

This Suntool Earth tool diagram (SunEarthTools.com) shows every specific region and what the highest sun angle is during the year. If you design your building based on the highest angle you can control daylight.

# Improving design knowledge to bring daylight into commercial building spaces

Understanding a building's structure and incorporating innovative daylight design allows natural light and fresh air to enter complex buildings, improving occupant well-being and performance while transforming spaces with optimized daylight.

Ensuring you have the daylight knowledge required will also help with making design adjustments. In the following chapter, we showcase three examples of how daylight can be incorporated into building design with simple specification.



Hallway with rooflights.  
A typical example of how to open up the roof and incorporate light and the outside view into the building design.



Hallway without rooflights

# A multipurpose office

The term multipurpose office is specific to typical offices found adjacent to larger industrial buildings. Because of how they are constructed, these buildings are often unable to bring in natural light through all four sides of the building. You need to overcome several design challenges to create a healthy, well-lit, and enjoyable working environment. Specific challenges to incorporate daylight into complex building spaces include: central staircases, communal kitchens, conference rooms and hallways.

**Kitchen**  
This is a key communal space for employees

**Staircase**  
Lighting up dark corners



Front



Ground floor

**Reception**  
First impressions should be well lit.

**Staircase**  
How to light up this dark corner?

**Kitchen**  
This is the heart of the building for employees

**Meeting room**  
No windows, no natural light

**Sitting corner**  
Should be a comfortable space for visitors

**Hallways**  
Usually dark

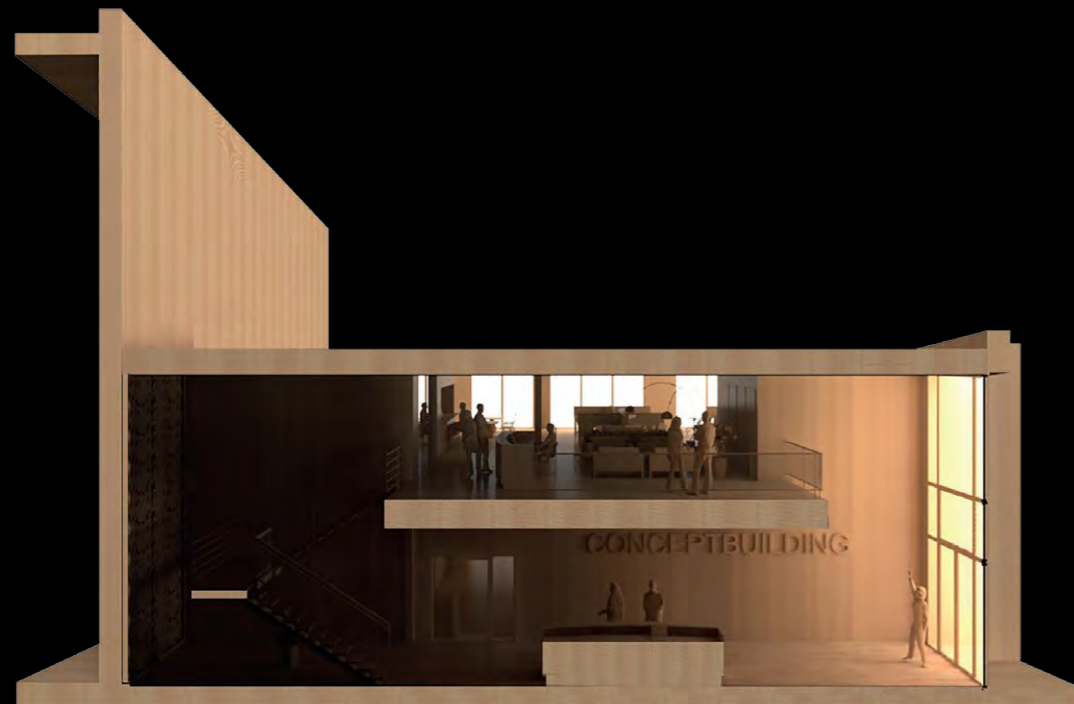


Ground floor and first floor

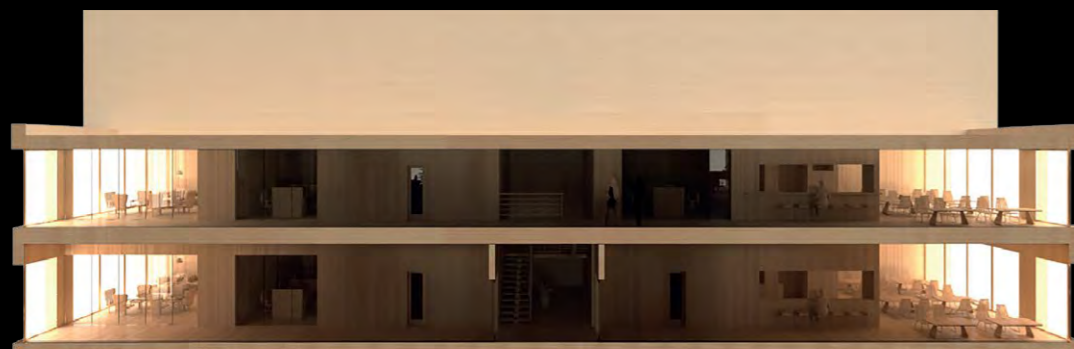
**Positive effect of adding daylight**

Traditional layouts of a multipurpose office don't allow much daylight to enter the core of the building. In this example, we show the effect of installing daylight solutions in the roof.

**Multipurpose office without rooflights**



Dark staircase, insufficient light in the reception area and sitting corners



Hallways, meeting room and kitchen require additional artificial lighting

**Multipurpose office with rooflights**



Well lit reception area, plenty of natural daylight in the sitting corner and hallways



Well lit staircase, the meeting room, hallways and kitchen area are now comfortable places instead of dark and uninviting



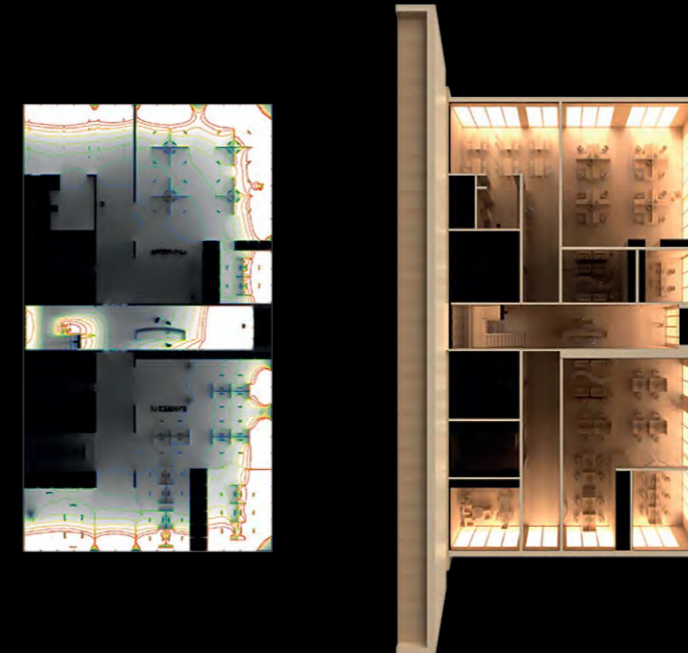
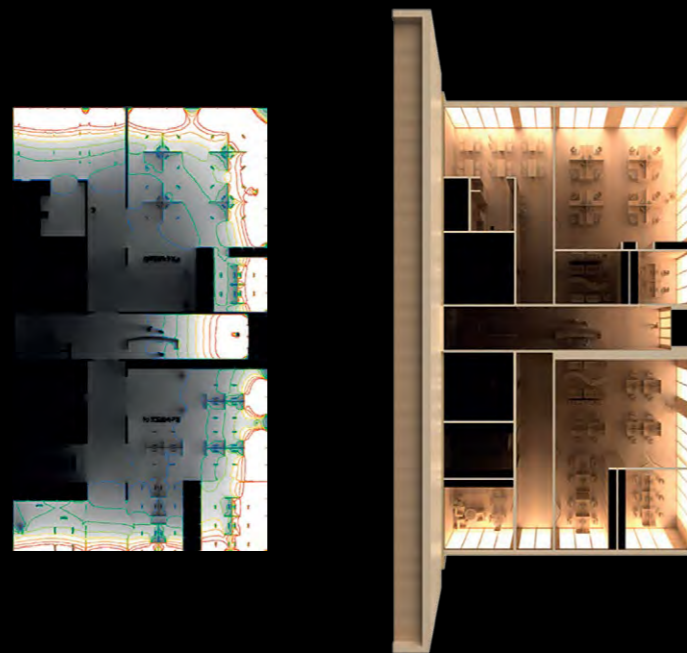
**Daylight simulation**

The VELUX Daylight Visualizer is a 3D simulation tool that analyses daylight conditions in buildings, showing the amount of daylight gained by adding rooflights which delivered three times more daylight than windows installed in the façade.

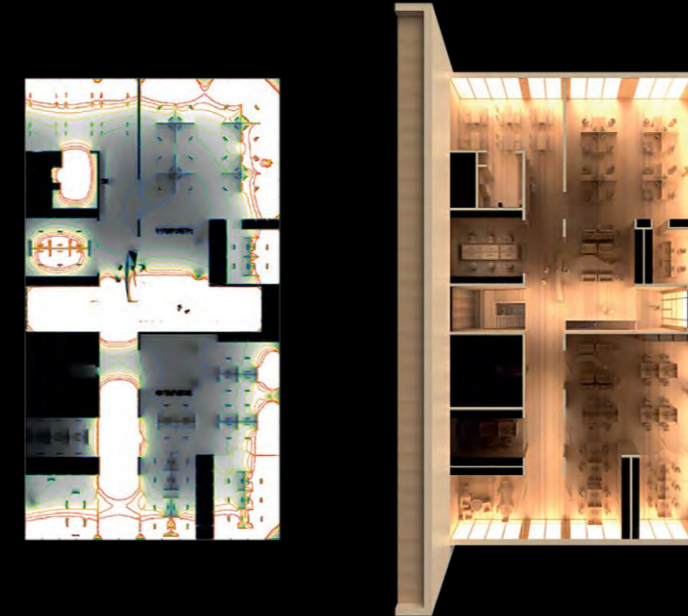
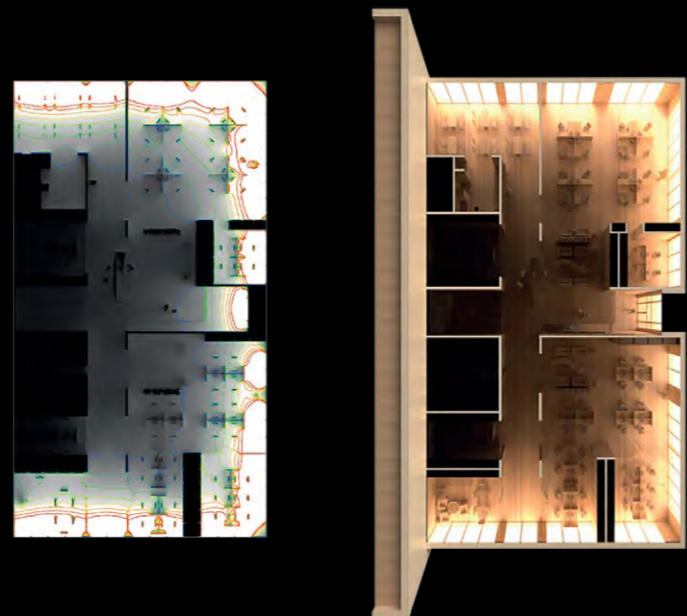
Without rooflight

With rooflight

Ground floor



First floor



Reception area, 3D rendering.



With rooflights



Without rooflights

Staircase, 3D rendering.



With rooflights



Without rooflights

# A showroom

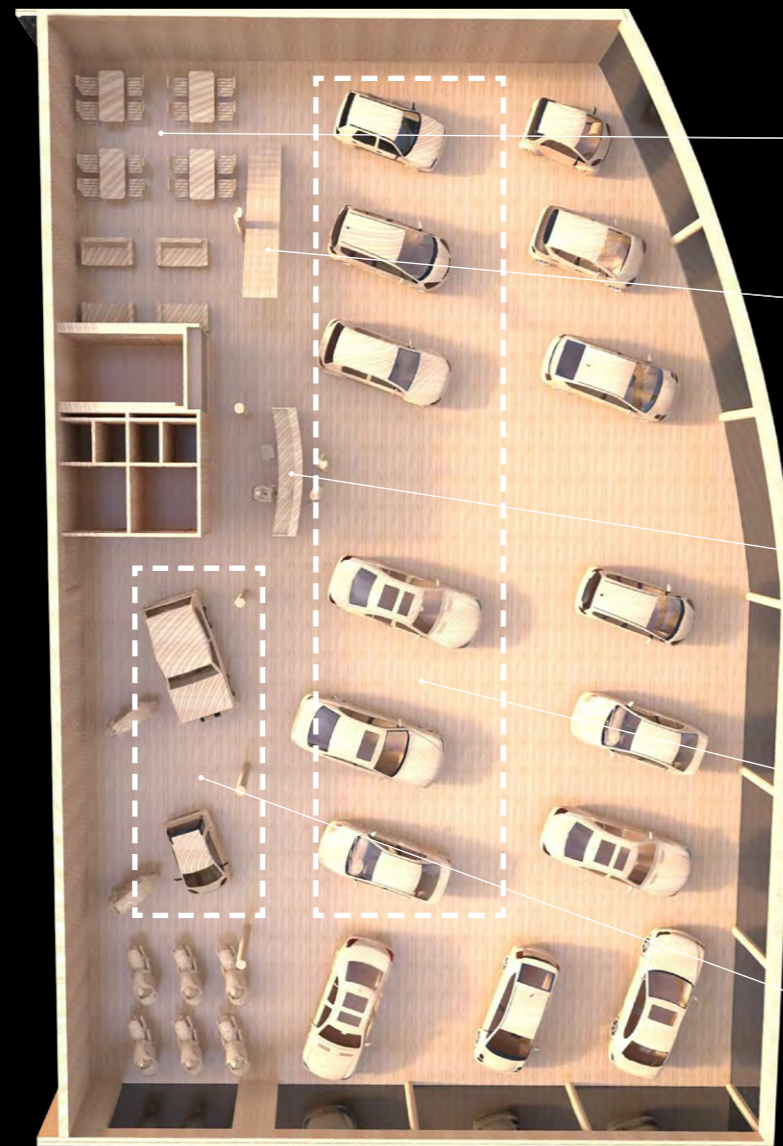
Showrooms are typically large areas that showcase products such as cars. They need to be represented in the best possible light for customers and clients to visualize and invest in products. Because a big surface area is often required, and because of the location of showrooms—as well as budget limitations, it's difficult to bring in natural light through all four sides of these large spaces.

## Creating a pleasant and healthy work environment

You need to overcome several challenges, if wishing to create a pleasant environment full of daylight. Spaces that are challenging to transform include central meeting points, waiting areas, meeting rooms and reception areas. Here we take a closer look at the possibilities to overcome the challenge of incorporating natural light into complex building spaces.



Front



Ground floor

**Waiting/meeting corner**  
Often no windows & dark

**Staircase**  
Safety first. SPINE:  
Leads to the balcony and  
let people overview the  
showroom

**Reception**  
Attraction point & first  
impression for visitors.  
Should be well lit.

**Central market zone**  
Layer 2  
How can daylight reach  
the deeper part

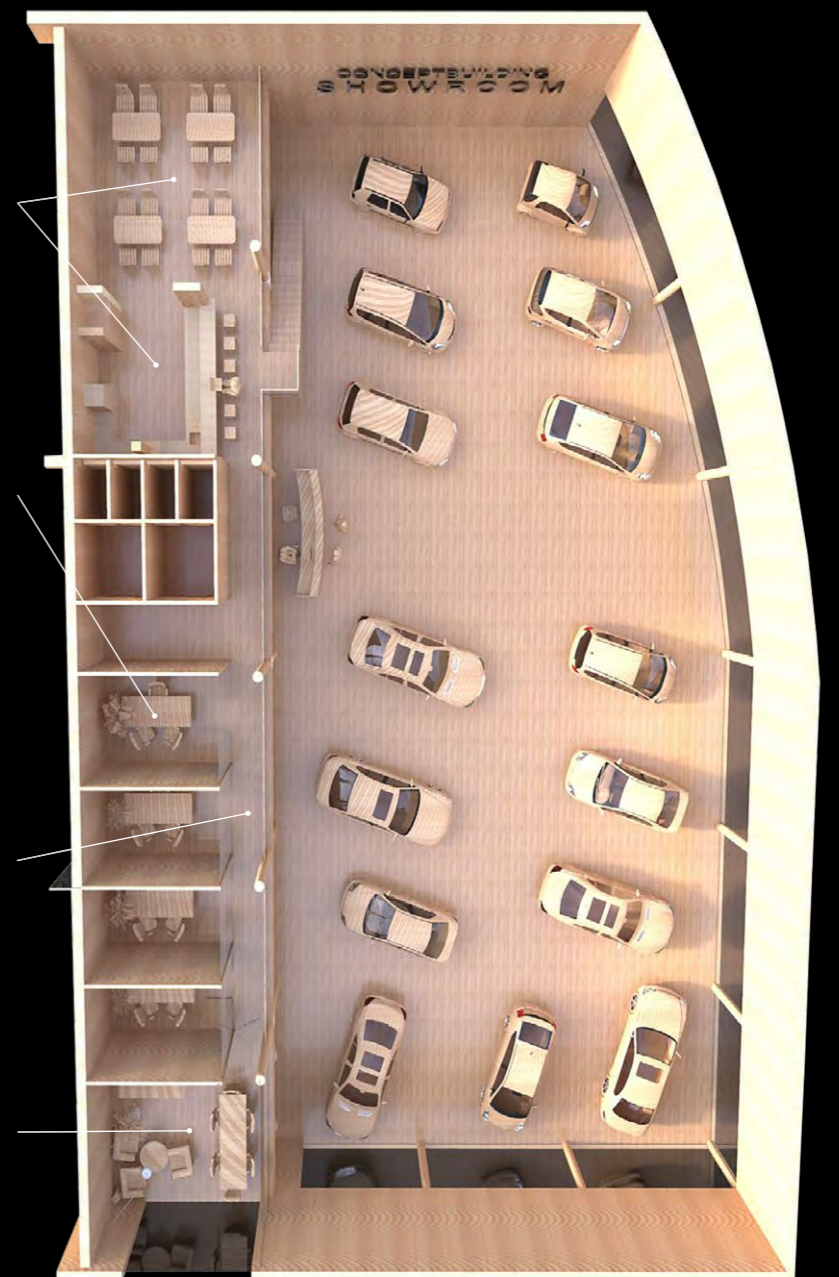
**Podium zone**  
Layer 3  
These are the most beautiful  
exposed models

**Reception/kitchen**  
This is the heart  
of the building for  
employees and the place  
to invite clients

**Meeting room/  
Administration**  
No windows,  
no natural light  
• Need for perspective  
& outside views  
• Enough views:  
See EN 17037  
• Need for natural light

**Balcony**  
Connecting everything on  
first floor. Usually dark

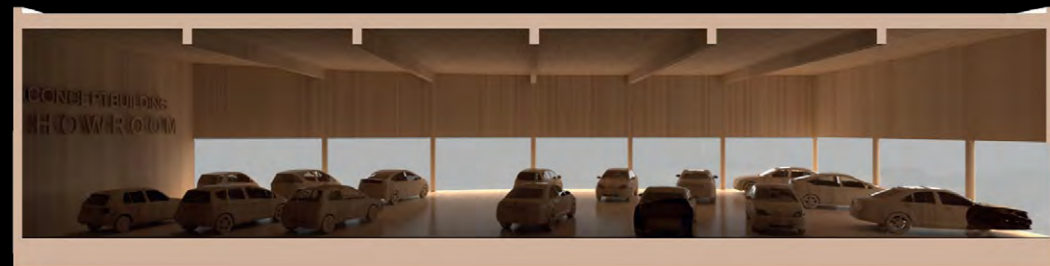
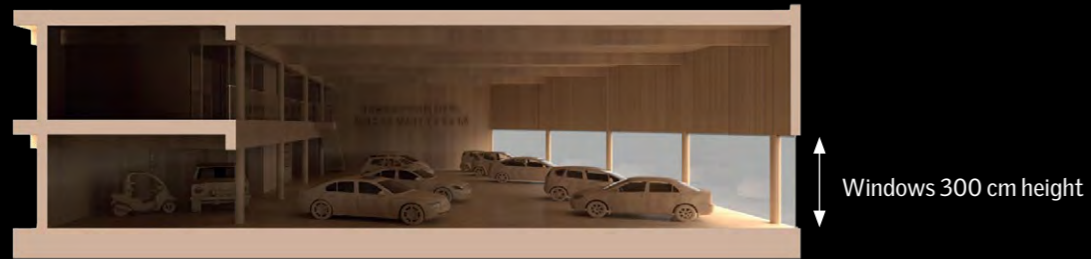
**Principals office**  
With the best  
possible overview  
of the Showroom



Ground floor and first floor

Deeper interior still not well lit:

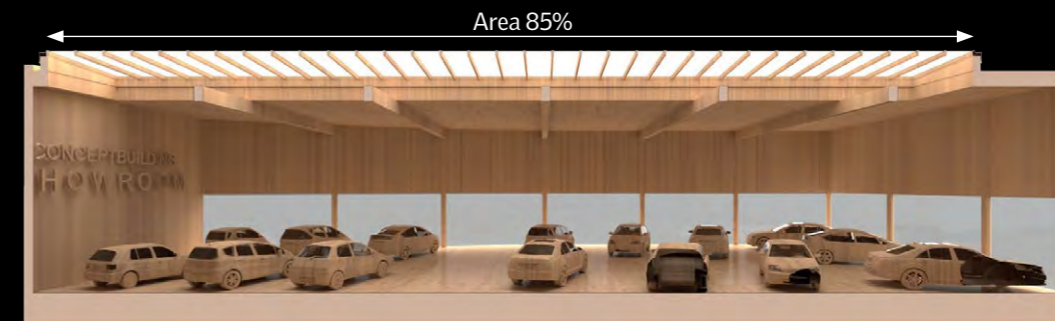
Showroom without rooflights



Showroom without rooflights – Larger facade windows



Showroom with rooflights



Adding rooflights potentially requires just 85% of glass compared to facades (100%).

- Natural daylight spreads throughout the entire space
- Extra perspective point on first floor (EN 17037)

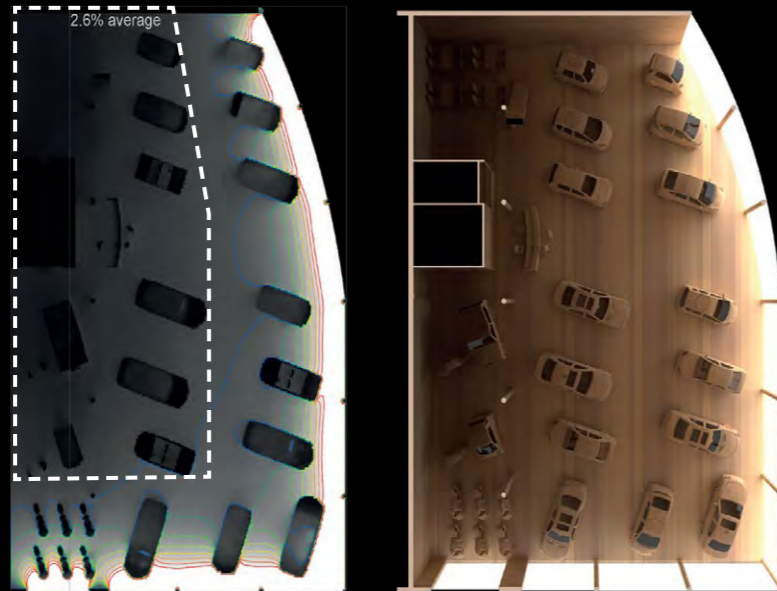
### Daylight simulation

The VELUX Daylight Visualizer is a 3D simulation tool that analyses daylight conditions in buildings, and shows the amount of daylight gained by adding rooflights. Rooflights delivered three times more daylight than windows in the façade.

Windows 300 cm height

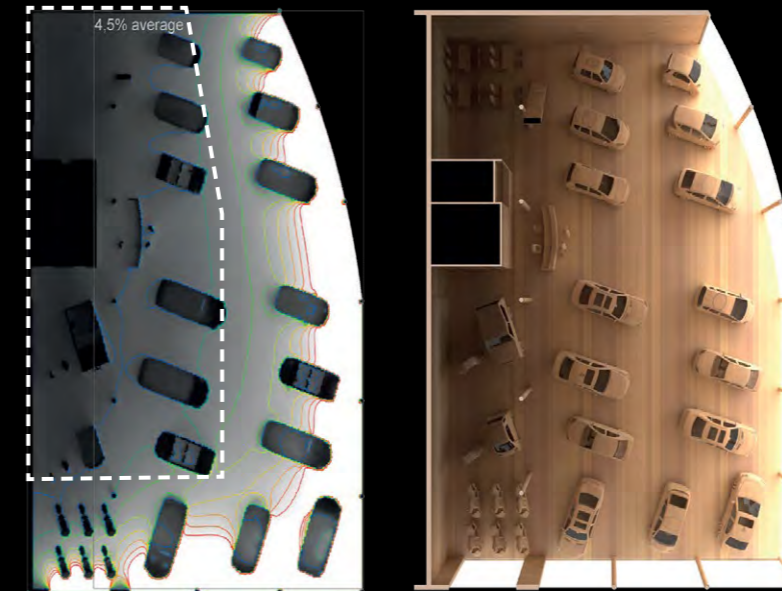
DFav 2.6%  
(5%=target)  
This option is underperforming

Show room



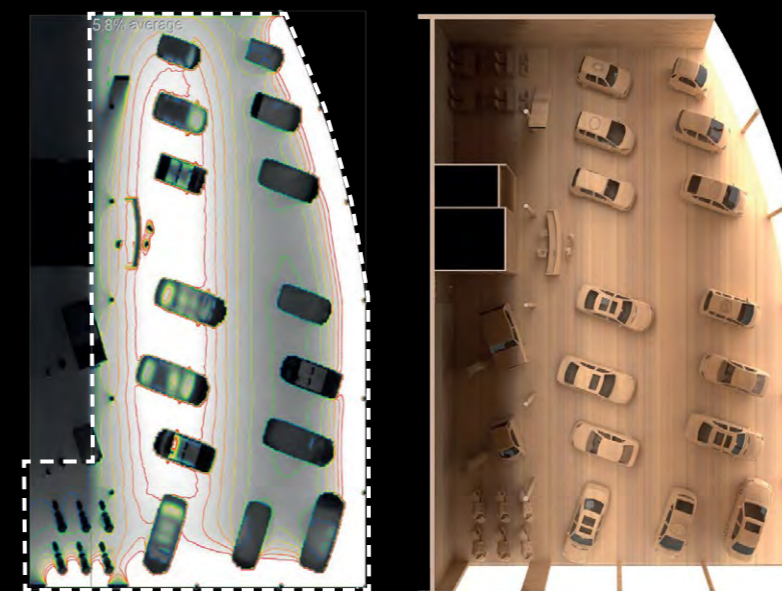
Windows 300 + 220 cm height

DFav 4.6%  
but very bad  
spreading of light  
EN 17037



Windows 300 cm height / With rooflight, Area 85%

DFav 5.8% =  
more than enough  
light + uniform  
spreading  
(EN 17037)



Ground floor, 3D rendering



With rooflights



Without rooflights

First floor, 3D rendering



With rooflights



Without rooflights

# Auditoriums

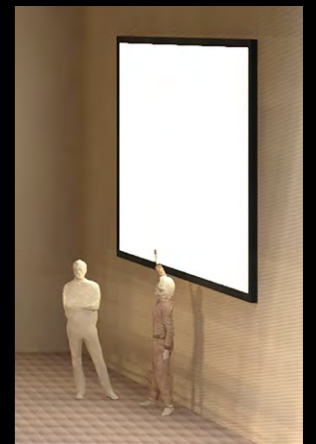
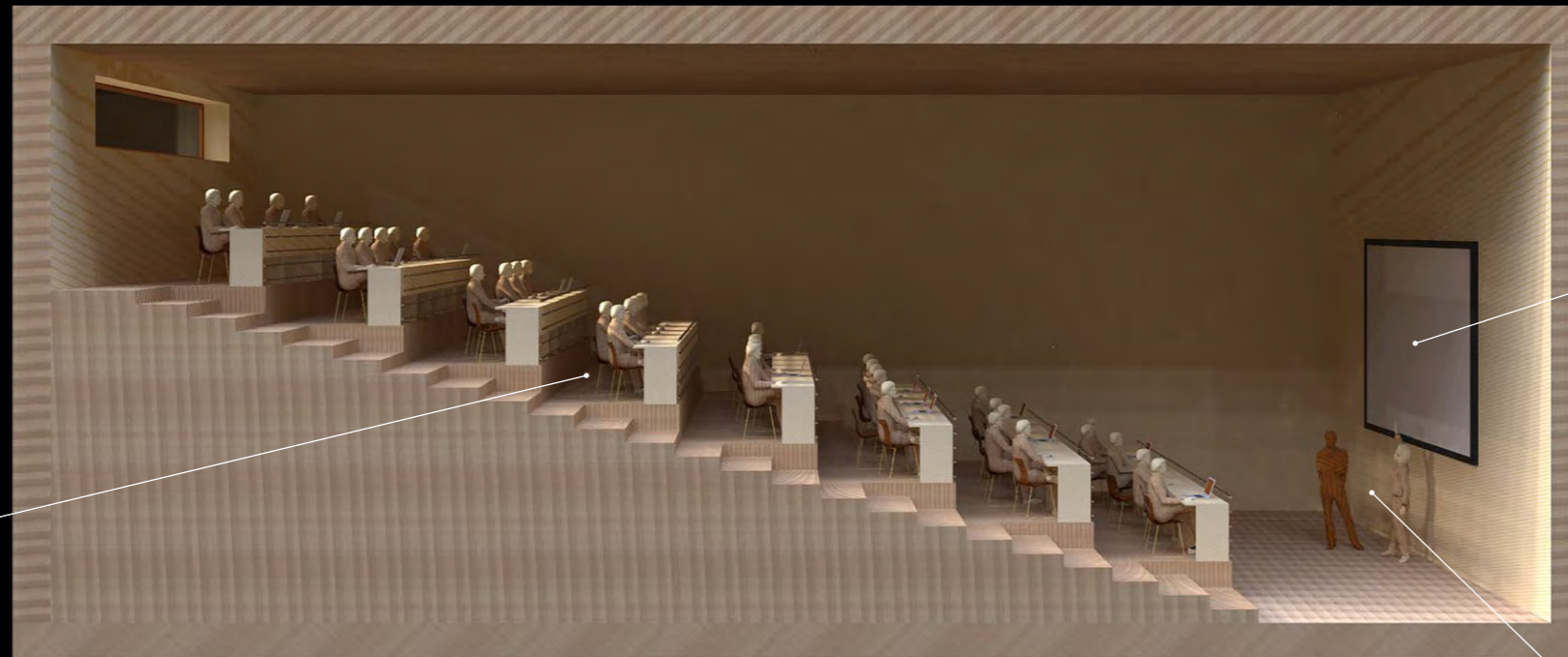
In enclosed auditoriums where students and teachers spend long periods of time learning, people can feel cut off from the world outside. Artificial light often ensures a space is lit but combining this with daylight can create a better learning environment with natural light and fresh air.

Daylight and ventilation solutions give learners an energy boost, empowering them to focus and be more productive. A connection to the outdoors can be achieved when building design considers rooflights as part of a building project, allowing fresh air into group spaces while transforming spaces, and improving wellbeing with natural light.



**The student:**

- 300 Lux on the worktop
- Outside view
- No reflectance on the screen
- No glare in the field of vision



**The projection screen**

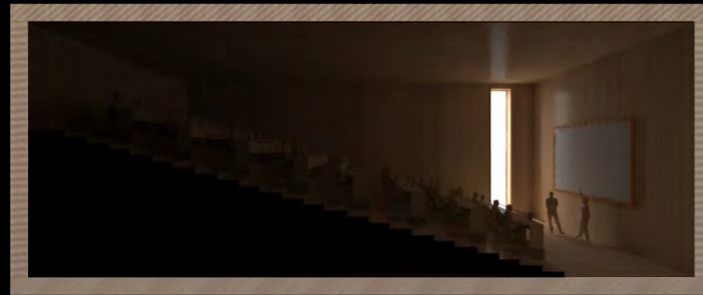
- In the dark: high contrast required
- No direct light on the screen



**The teacher**

- Outside view
- No glare in the field of vision

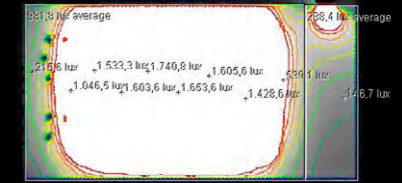
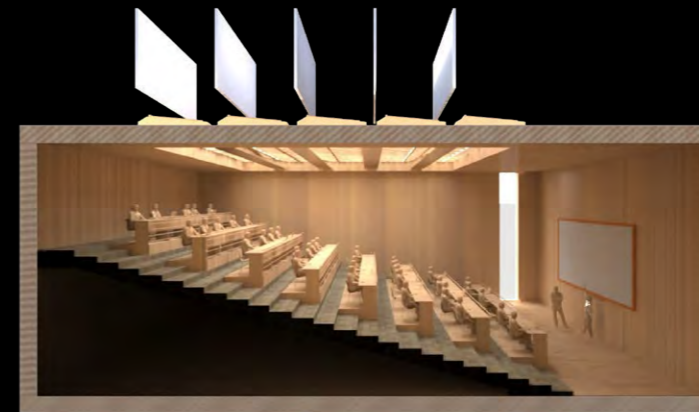
# Effect of adding daylight



## Solution 1

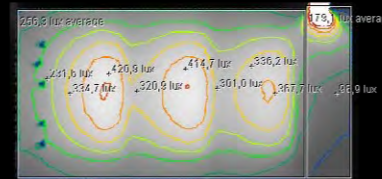
### Side window

- More light on teacher vs on screen
- Causes high contrast for the teacher
- Possible direct sunlight on board



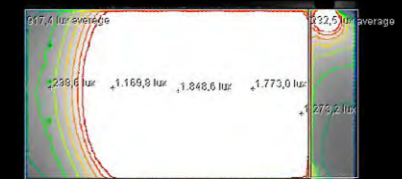
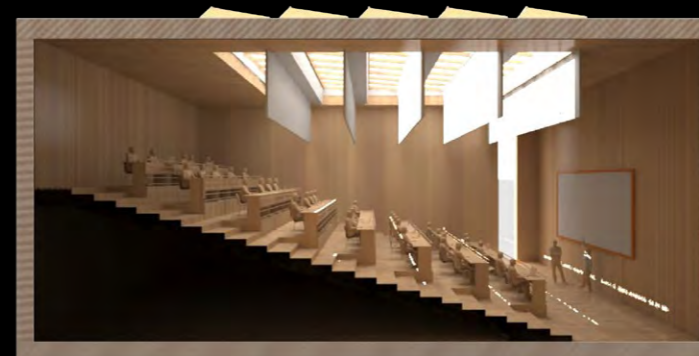
## Solution 4

### Blocking and reflective vertical outside panels



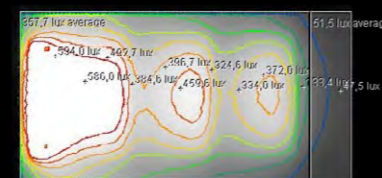
## Solution 2

### Sidelight and shed solution



## Solution 5

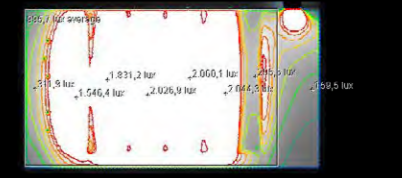
### Blocking and reflective vertical inside panels



## Solution 3

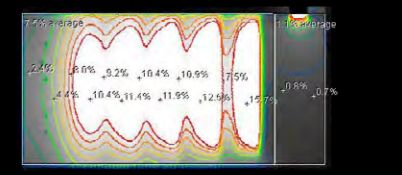
### Sidelight and shed solution

- The window brings in most light, however:
- It can cause reflection on laptops in upper rows of tiered spaces
  - Possible direct sunlight exposure on project screen



## Solution 6

### Blocking and reflective ceiling



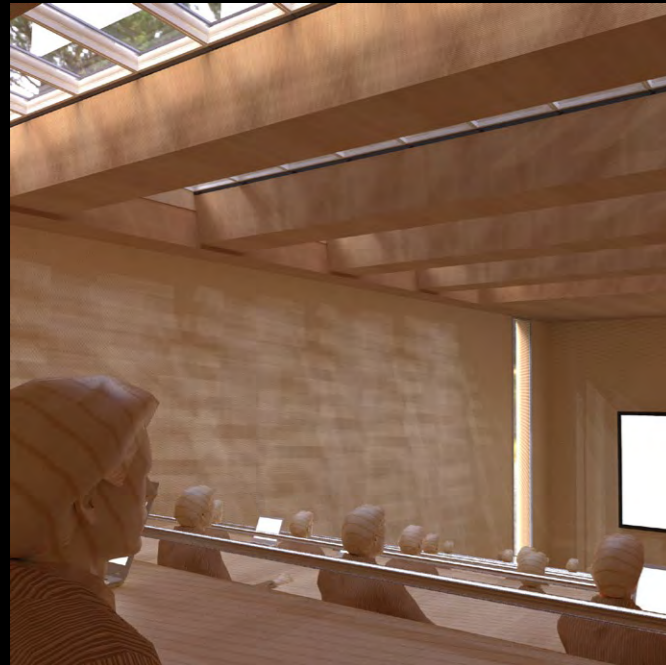
## Solution 7

### Enhanced blades

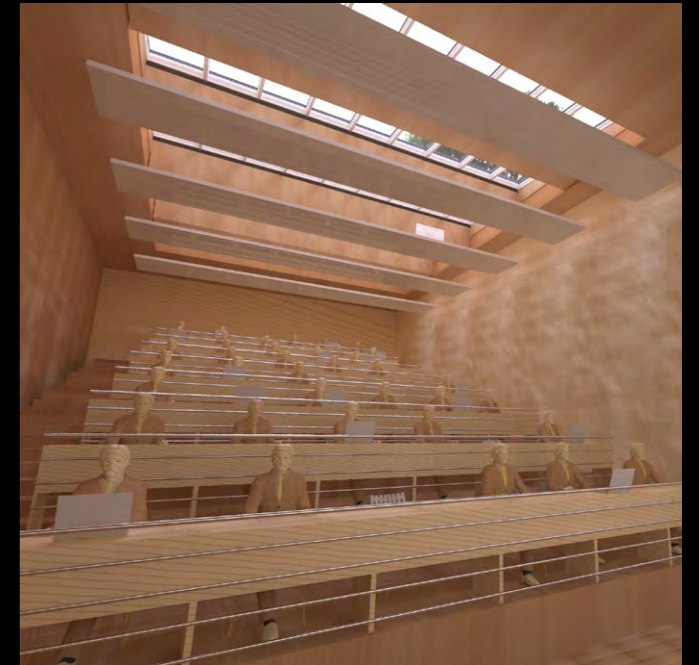


3D rendering

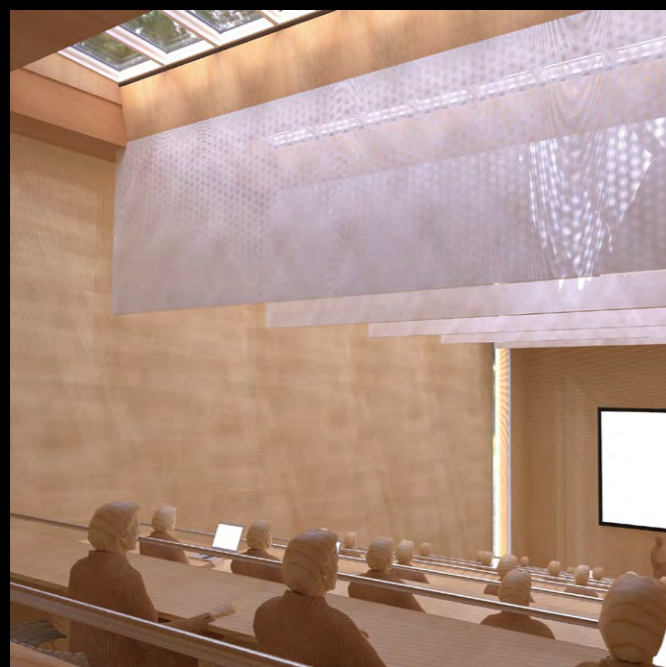
**Scenario 4:**  
Blocking and reflective vertical outside panels



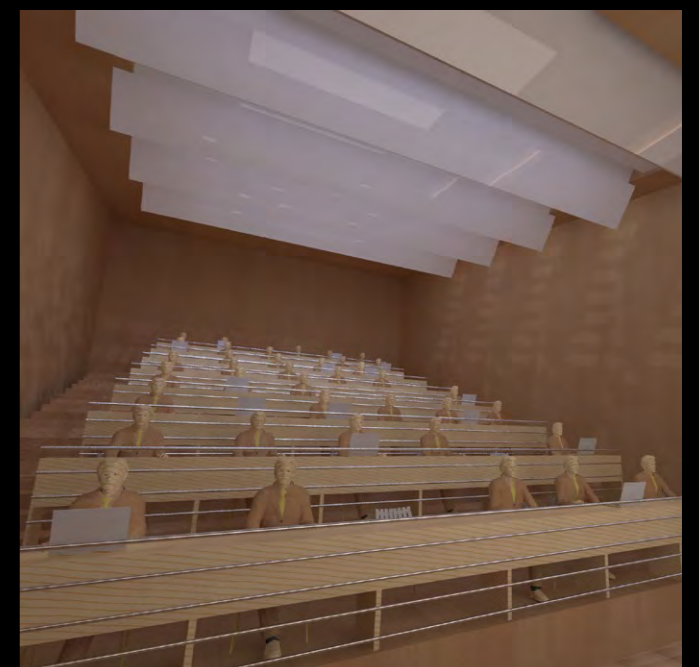
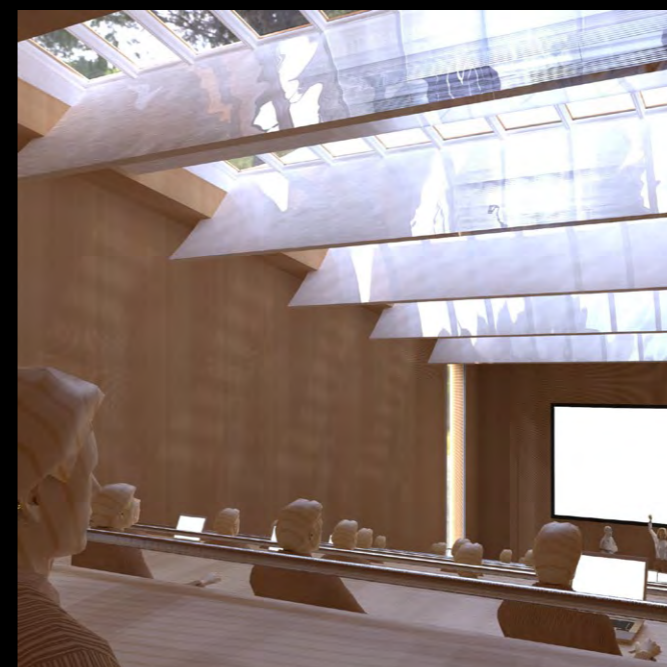
**Scenario 6:**  
Blocking and reflective ceiling



**Scenario 4:**  
Blocking and reflective vertical inside panels

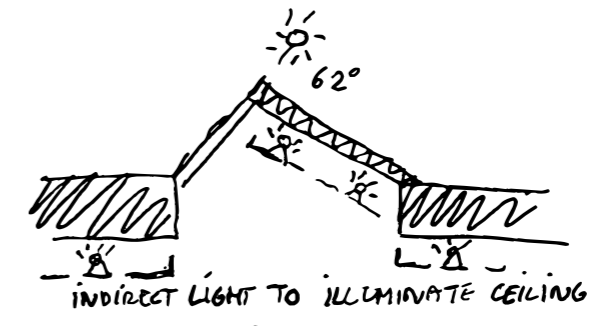
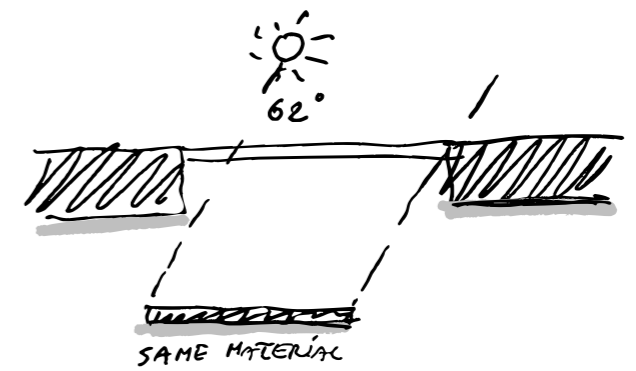
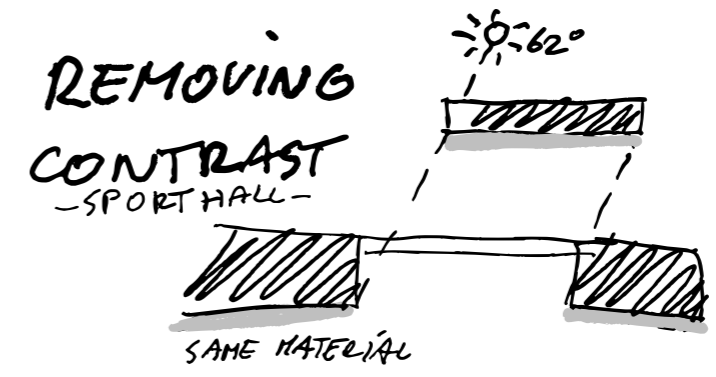


**Scenario 7:**  
Enhanced blades





TERMINAL 3



## Product categories

**We have a flexible range of products and daylight solutions to meet your commercial building project needs.**

### **Dome rooflights and flat glass rooflights**

We offer a flexible and diverse range of dome and flat rooflights in a variety of shapes and sizes to provide natural light.

### **Continuous polycarbonate rooflights**

Continuous polycarbonate rooflights are lightweight and durable options that meet the demands of commercial and industrial building projects. Our range of polycarbonate rooflights can be used for refurbishment and new build projects with customisable products to suit project requirements.

### **Glass roof systems**

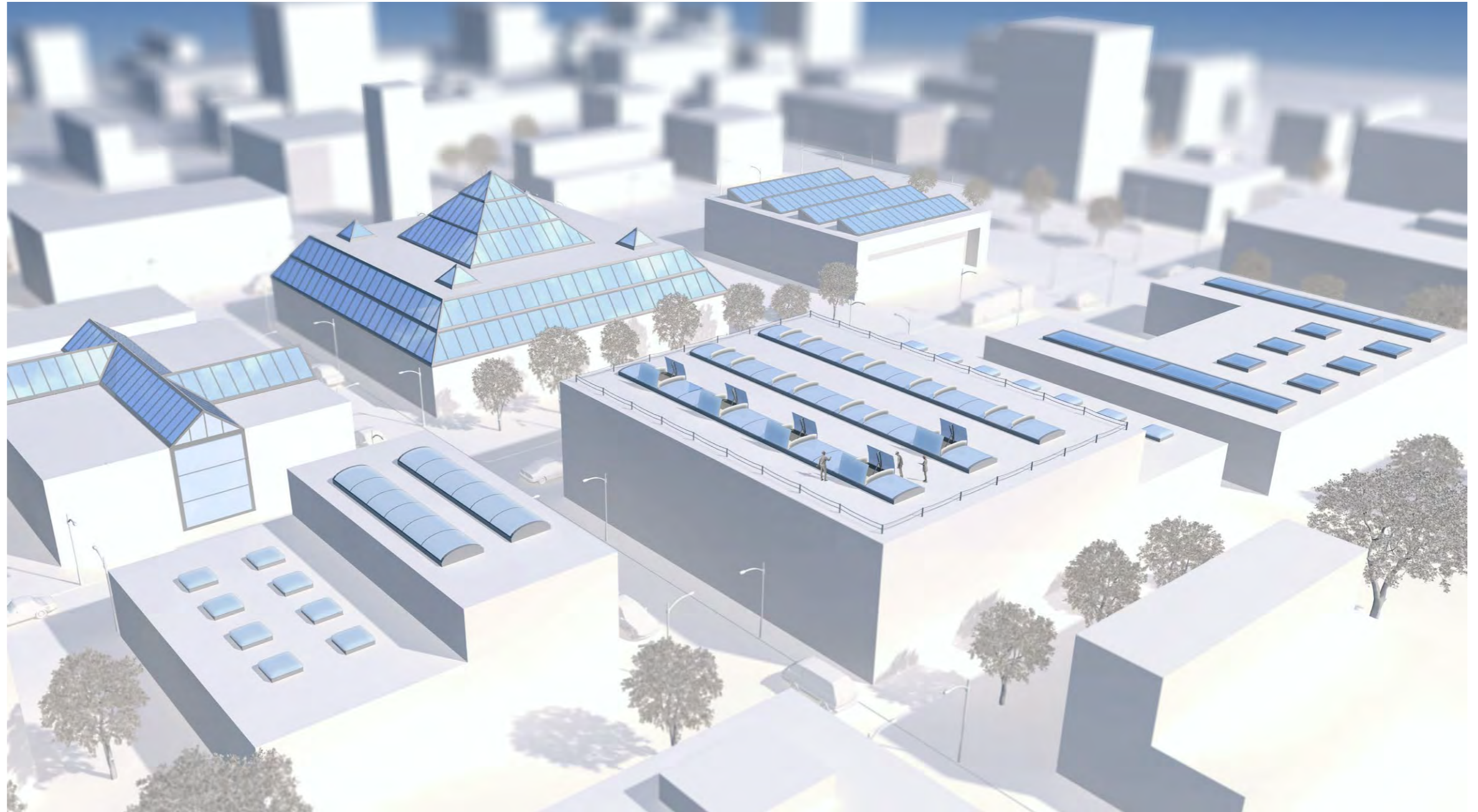
Glass roof systems combine form and function to produce centrepiece rooflights for commercial buildings, while remaining high-performance in office, educational, public and retail spaces. We produce a range of rooflights that optimize daylight and fresh air to enhance the well-being of building occupants. Glass roof systems can be configured for the most complex of design specifications.

### **Smoke and natural ventilation**

Natural ventilation provides buildings with fresh air, removing toxins and unwanted fumes from commercial building spaces. Smoke and heat exhaust ventilation, as well as comfort ventilation can be integrated into rooflights and configured to open and close. Opening rooflight panels can control indoor climate and in the event of fire, reduce risk to building occupants.

### **Service and maintenance**

VELUX Commercial can provide qualified maintenance and support for long-term reliability of your rooflights. We have an expert team of certified service technicians who can provide a comprehensive range of ongoing rooflight services for years to come.



# Dome rooflights and flat glass rooflights

**Dome rooflights and flat glass rooflights are flexible and durable, providing single sources of daylight, as well as roof access and ventilation.**

**Key benefits:**

- Prefabricated for fast installation
- Versatile and thermally efficient
- Bespoke sizes for all buildings

Dome rooflights and flat glass rooflights combine quality performance with striking aesthetics to provide natural light. They are available in a wide range of shapes and sizes and can also include ventilation to provide comfort and remove toxins and smoke from any type of commercial building.



# Continuous polycarbonate rooflights

Suitable for both flat and sloped roofs, continuous polycarbonate rooflights are ideal for commercial and industrial applications, providing daylight, natural and certified smoke ventilation.

**Key benefits:**

- Cost-efficient and highly durable
- Customizable to meet the needs of a project
- Certified smoke and heat exhaust ventilation

Continuous polycarbonate rooflights are perfect for covering large areas of pitched or flat roofs and are suitable for both new-build and refurbishment projects.



# Glass roof systems

**Glass roof systems combine form and function, creating skylights that spread natural light throughout commercial buildings.**

**Key benefits:**

- Almost unlimited design flexibility
- Bespoke and prefabricated rooflight systems
- Accurate design specifications complete with installation

VELUX Commercial provides a portfolio of prefabricated, structural and bespoke rooflights for refurbishment and new build projects. Our rooflights are suitable for schools, offices, retail and public buildings, as well as heritage venues.



## Smoke and natural ventilation

**VELUX Commercial's extensive product range includes rooflights that provide natural and smoke and heat exhaust ventilation and open automatically upon detection of smoke.**

### Key benefits

- Assists in the removal of smoke and unwanted fumes
- Improves the well-being of building occupants
- Can be programmed to adjust to a building environment

VELUX Commercial's portfolio of rooflights include a wide range of natural venting and SHEV rooflights for commercial buildings.

Whether your building is a commercial office or industrial manufacturing plant, we have a solution that is fit for purport and in accordance with EN 12101-2.





# Service and Maintenance

From product selection, design and technical support, through to installation and aftersales service, VELUX Commercial aims to be your preferred partner for commercial rooflight solutions. We can support you with the following:

- Rooflight product selection and design
- Planning and delivery
- Installation
- Aftersales service



**Installation Service**  
We offer an installation service for your commercial rooflight project.



**Guarantee and conditions**  
Discover which guarantee and conditions your product is covered by.

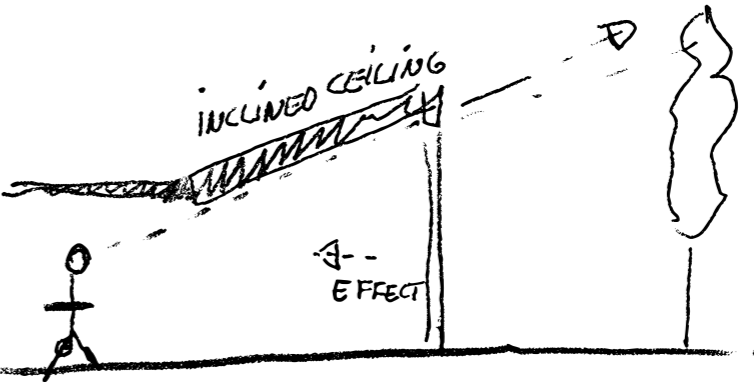
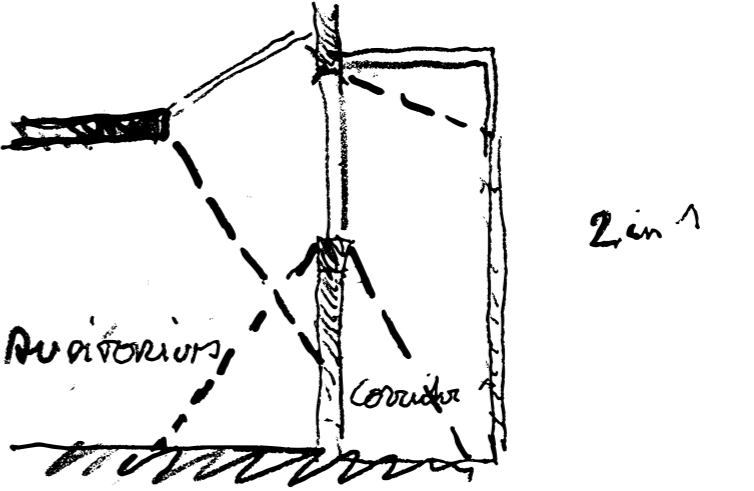
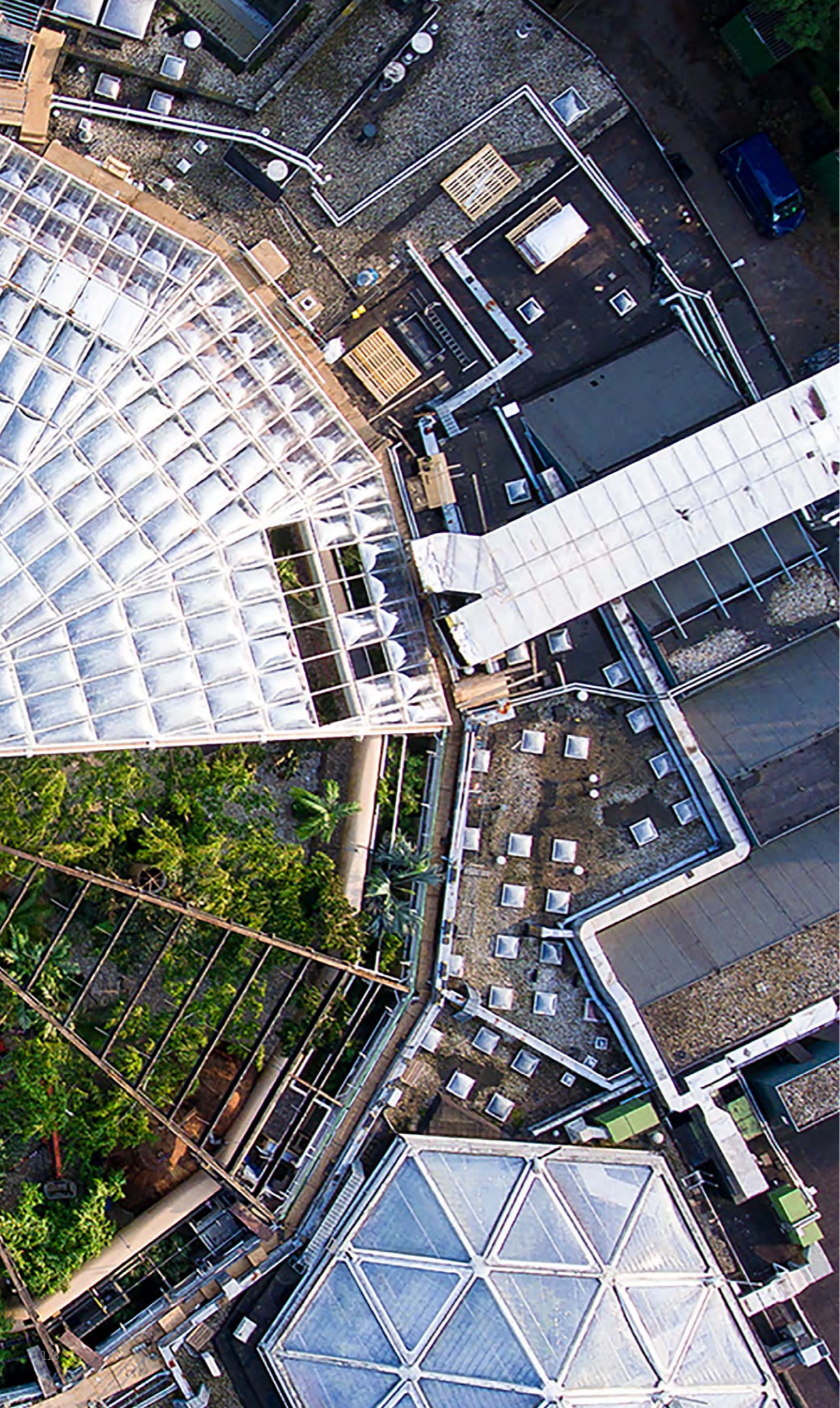


**End-to-End Rooflight Support**  
We offer complete end-to-end support – from product selection and technical support to installation and after-sales service.



**Contact us**  
Get in contact with our local team of experts for help with everything from planning to design and installation of your project.

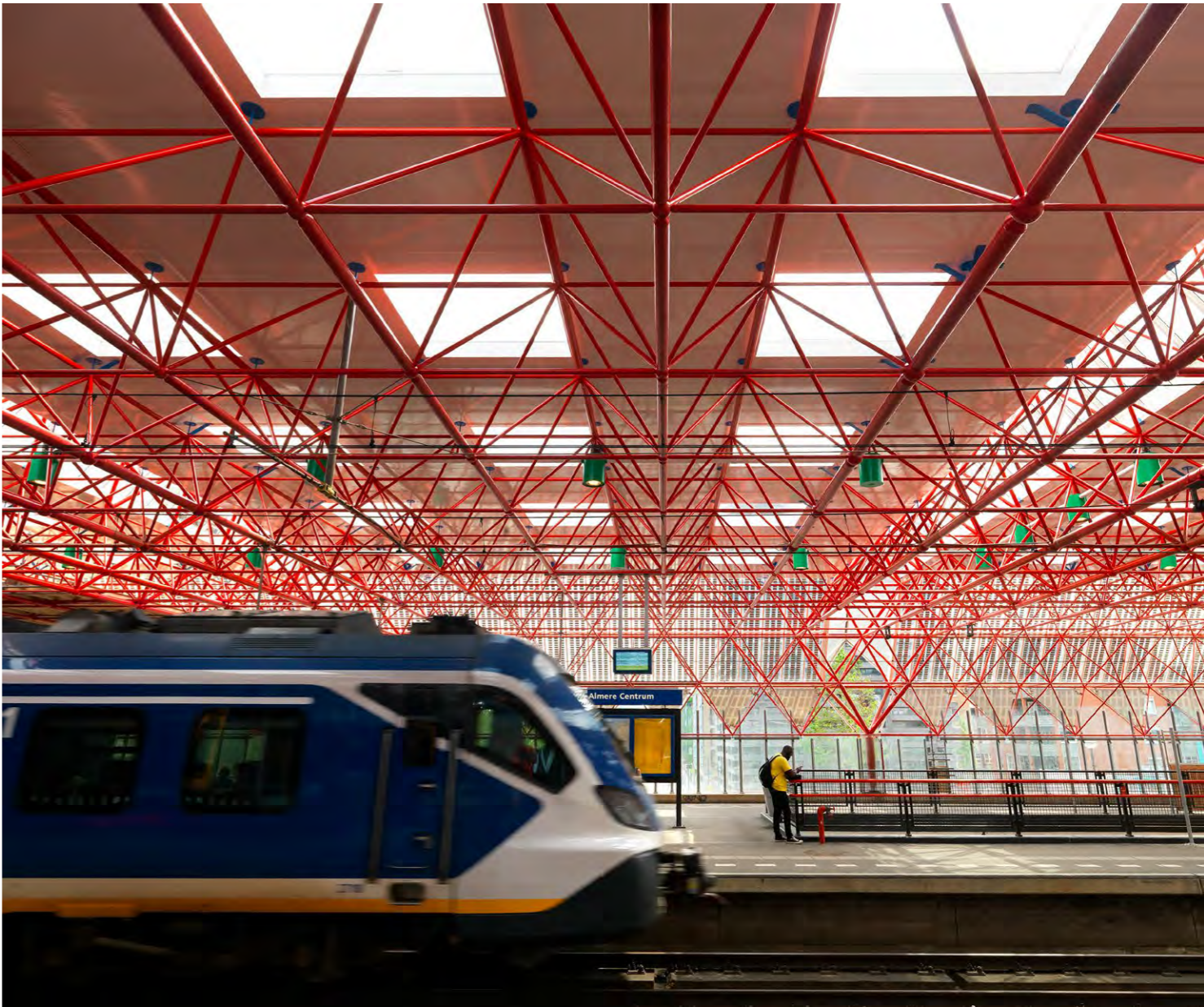




WINDOW IS MOVING CLOSER  
BECAUSE OF DISAPPEARING CEILING

# Almere Railway Station, the Netherlands

Solutions: Dome Rooflights and Stick System, DC



Koenig & Bauer Kammann GmbH, Germany

**Solution: Dome Rooflights with SHEV**



Nordhavn Terminal 3, Denmark

Solution: Dome Rooflights



K.B. Hallen sports facility, Denmark

Solution: Modular Rooflights, Monolight



Kusterman, the Netherlands

**Solution: Ambiente Glazing Products**





Bauhaus retail chain, Denmark

Solution: Continuous Rooflight, PC-lysbånd



# Hornbach DIY Store, the Netherlands

Solution: Vario Norm Barrel Vault



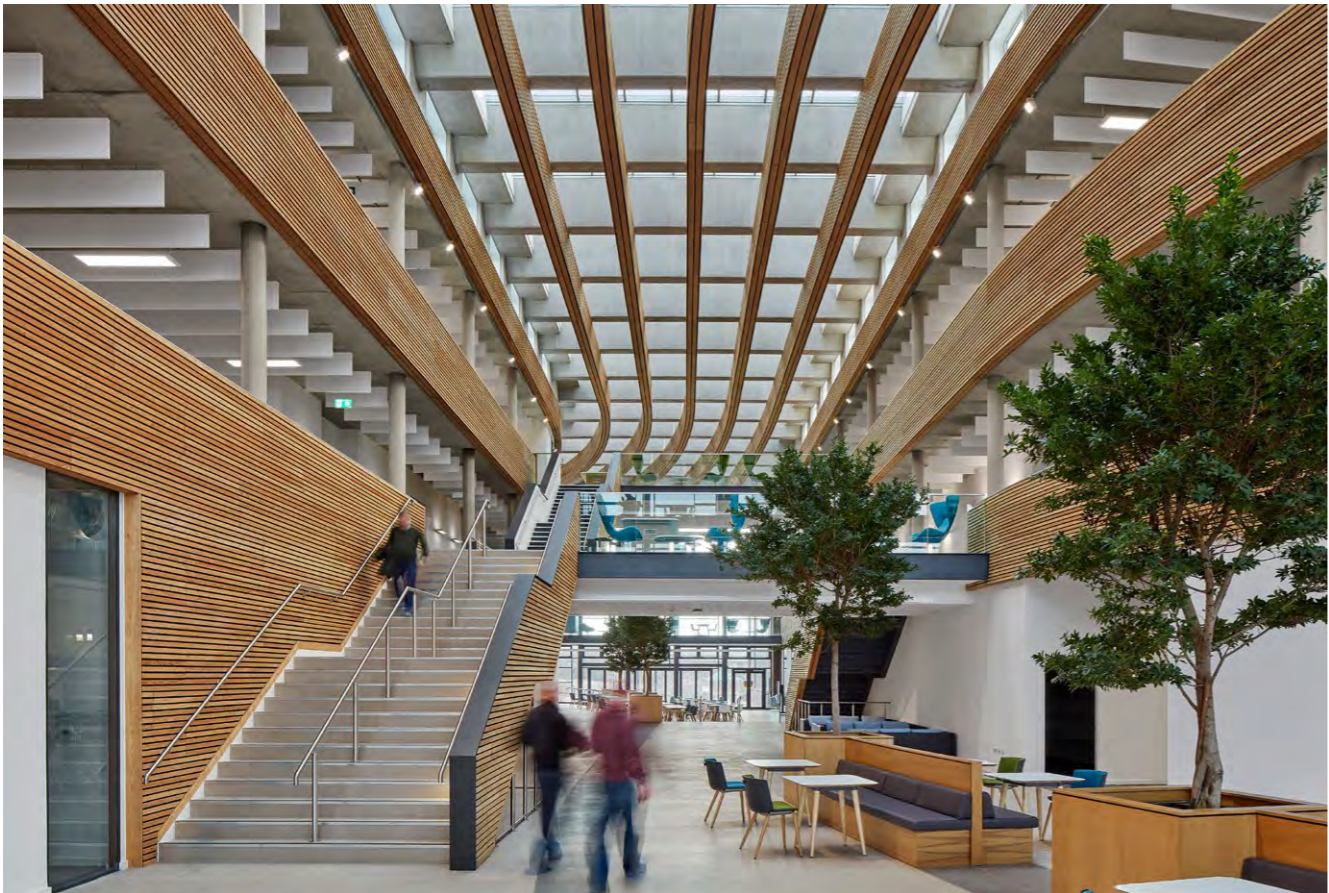
Otto Suhner AG, Switzerland

Solution: GRILLODUR® Mono Pitched Continuous Rooflights



UK Hydrographic Office, UK

Solution: Modular Skylights, Atrium Longlight



Jakon Headquarters, Denmark

**Solution: Glazing Panels, Dual Pitched Solution**



Residential apartments, Denmark

**Solution: Modular Rooflights, Linearlight**



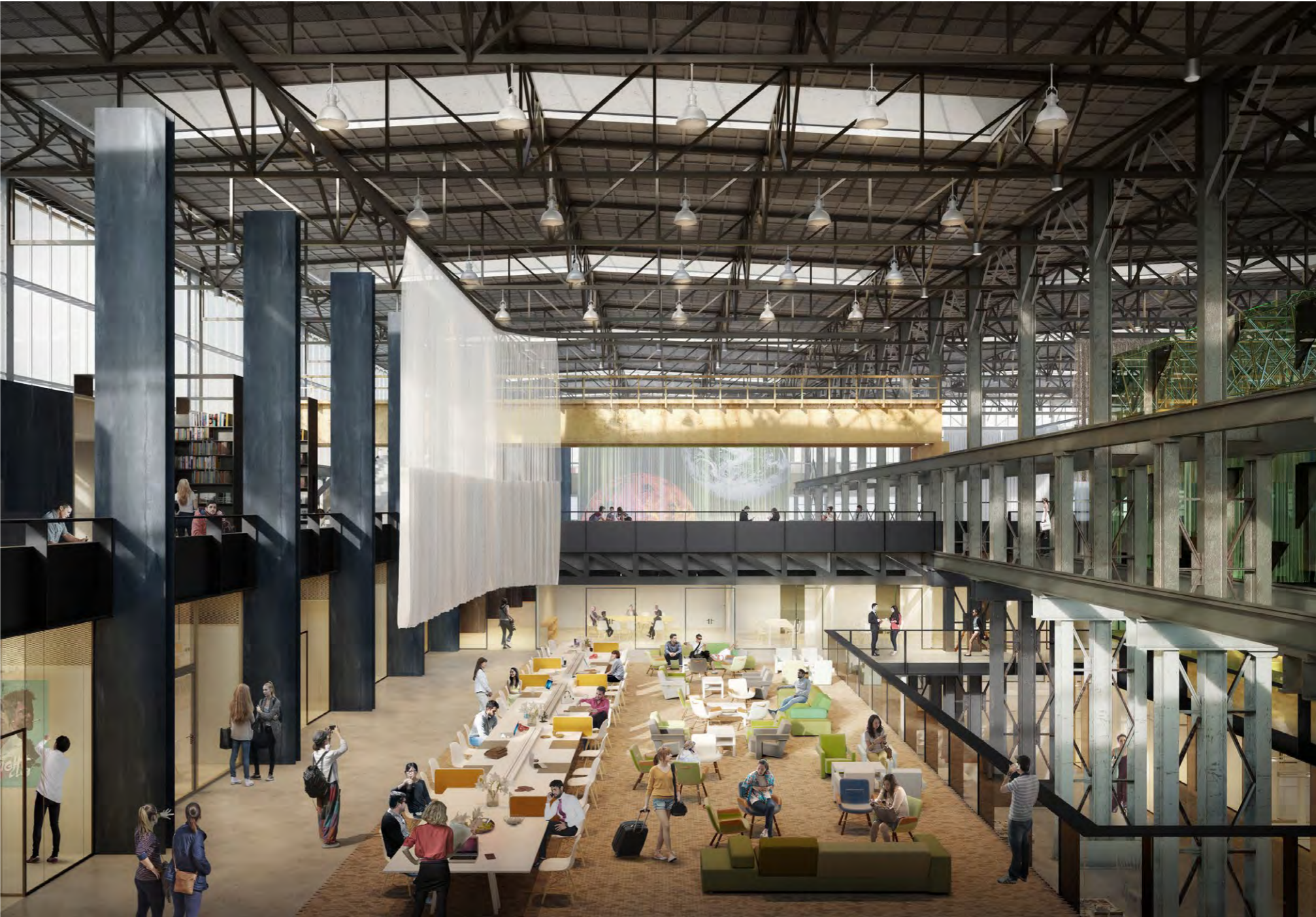
Ludwigshafen (Rhein) Mitte Station, Germany

Solution: Stick System, BA



LocHal, the Netherlands

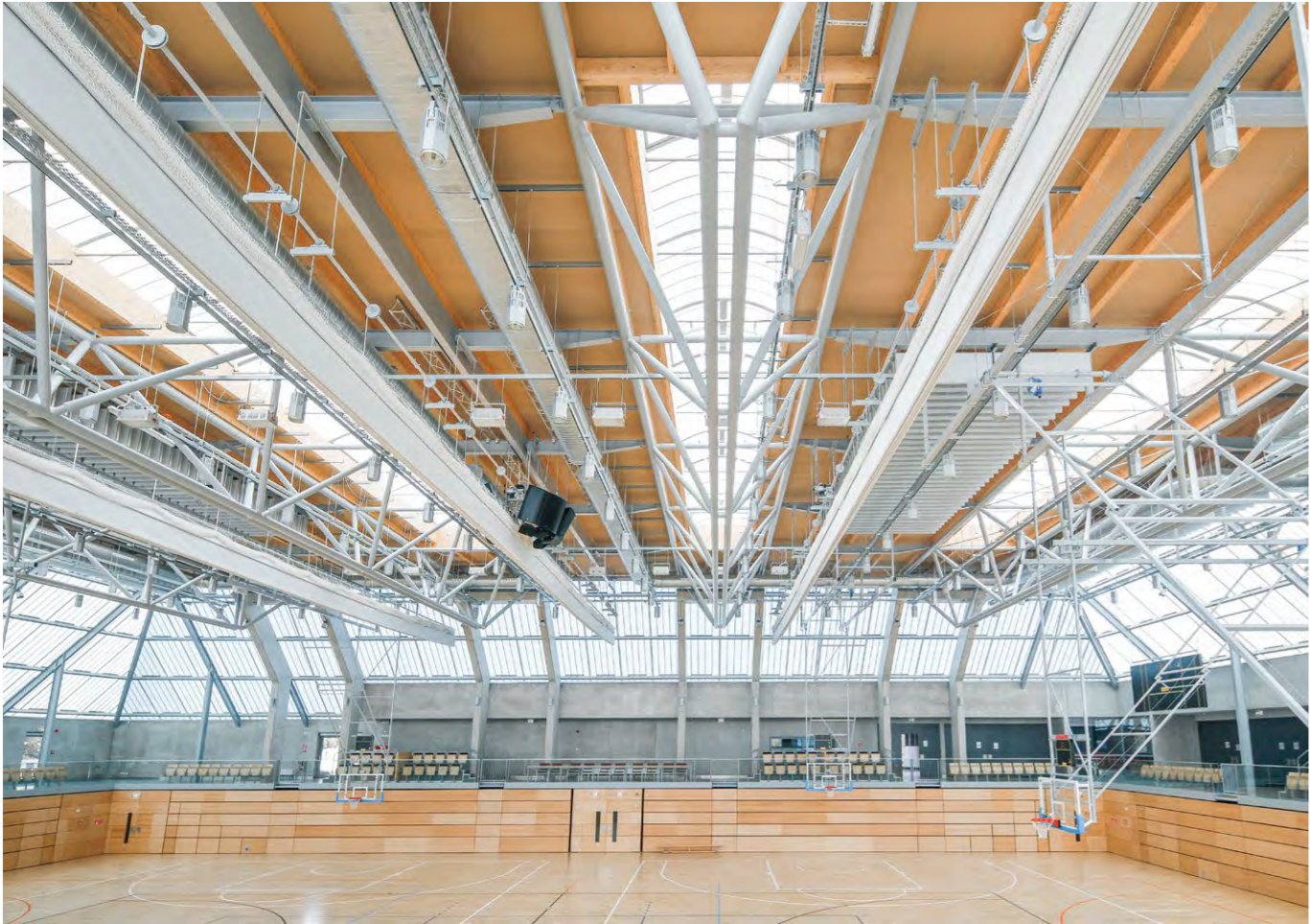
Solution: Stick System, BA





# Bertrange sports centre, Luxembourg

**Solution: GRILLODUR®, Barrel Vault and Mono Pitched Continuous Rooflights, Light Facades**



APRIL / JUNE 2009

JAN - APRIL 2009

OCT 2008 - JAN 09

SEPT 2008

JULY - AUG 2008

APRIL 2008

MAY 2008

2008

FEB / MAR 2008

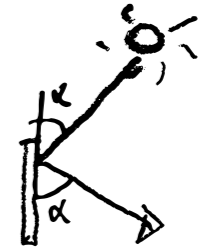
NOV 2007

JULY 2007

MAY 2007

OCT 2009  
JULY 09  
JUNE VENICE 2009  
APRIL / JUNE 2009  
JAN - APRIL 2009

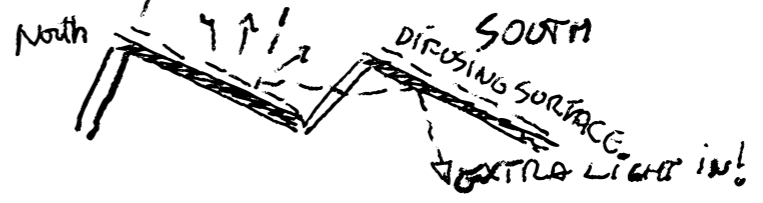
MIRRORS ARE NOT GETTING HOT  
⇒ THEY DON'T STOP EFFECT OF DIRECT LIGHT, THEY ONLY CHANGE IT'S DIRECTION!



EGGSHELL SURFACES MAKE LIGHT DIFFUSE (PLASTER) SO LESS HARMFUL

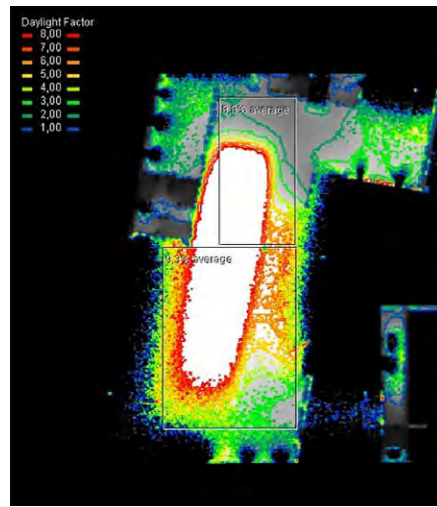


THINK "OUT OF THE BOX": REUSE OR CONVERT YOUR LIGHT!

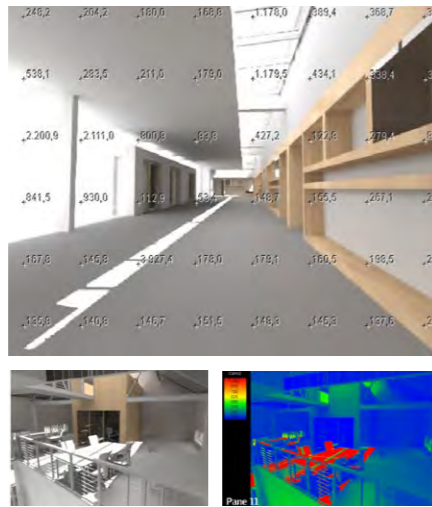


## Daylight design support

VELUX Commercial provides design advice and support for all commercial buildings. Our support includes daylight analysis of your building spaces, analyzation rendering and animation examples that come with 360-degree interactive views of project space.



Daylight analysis



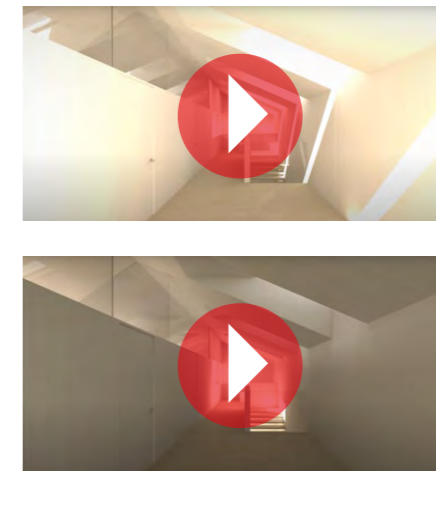
Luminance and illuminance simulations



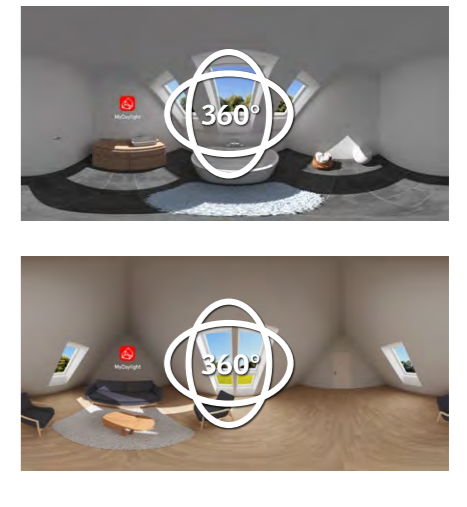
Interior render



Exterior render



Sunlight animation



360° View

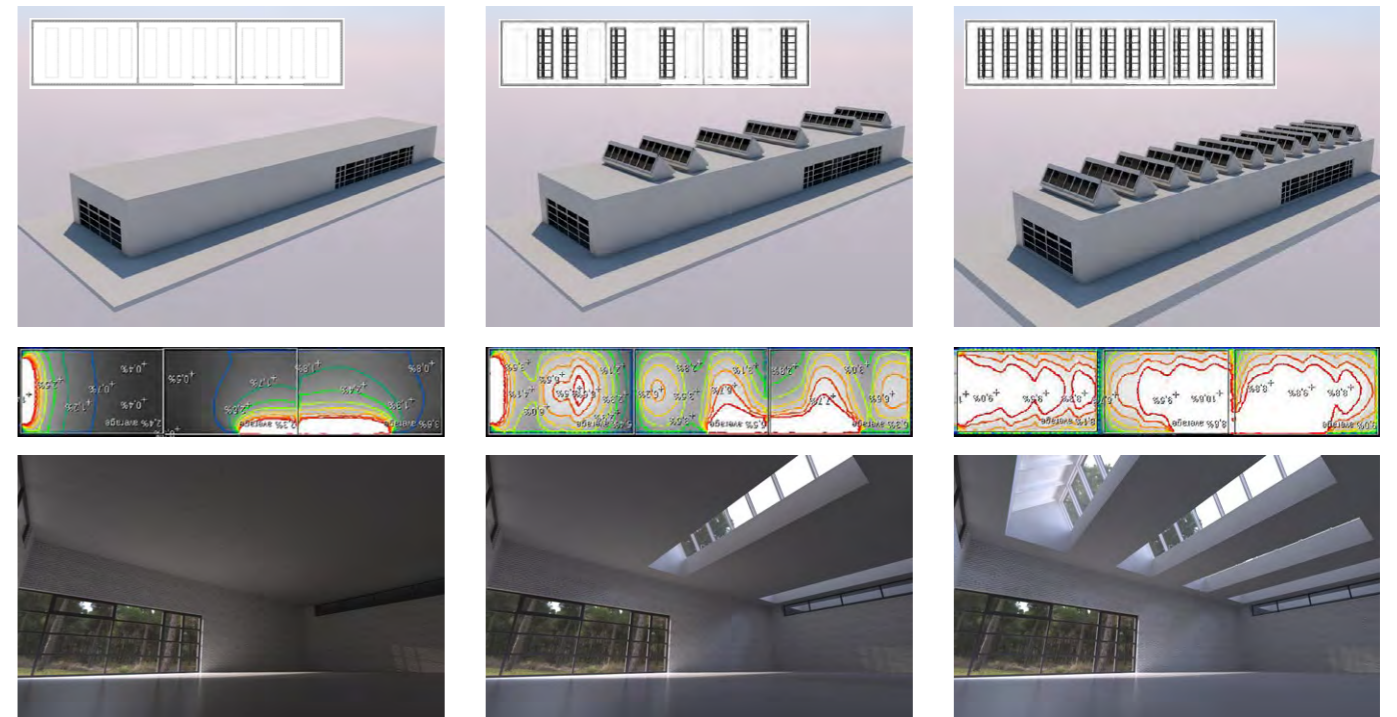
# Daylight Visualizer

The VELUX Daylight Visualizer is a 3D simulation tool that analyses daylight conditions in buildings. This digital tool exceeds more commonly used visualization programs, giving you the ability to acutely simulate and quantify daylight levels in interiors, and make more informed design when specifying daylight requirements at the start of a project.

### With our Daylight Visualizer you can:

- Calculate daylight factors
- Evaluate requirements for the European Standard Standard for Daylight in Buildings EN 17037
- Perform photo-realistic and false colour visualizations of daylight in interiors under the 15 general sky types defined by CIE
- Quickly create simple models or import detailed models from a wide range of CAD/BIM software including REVIT, ARCHICAD, SKETCHUP and more

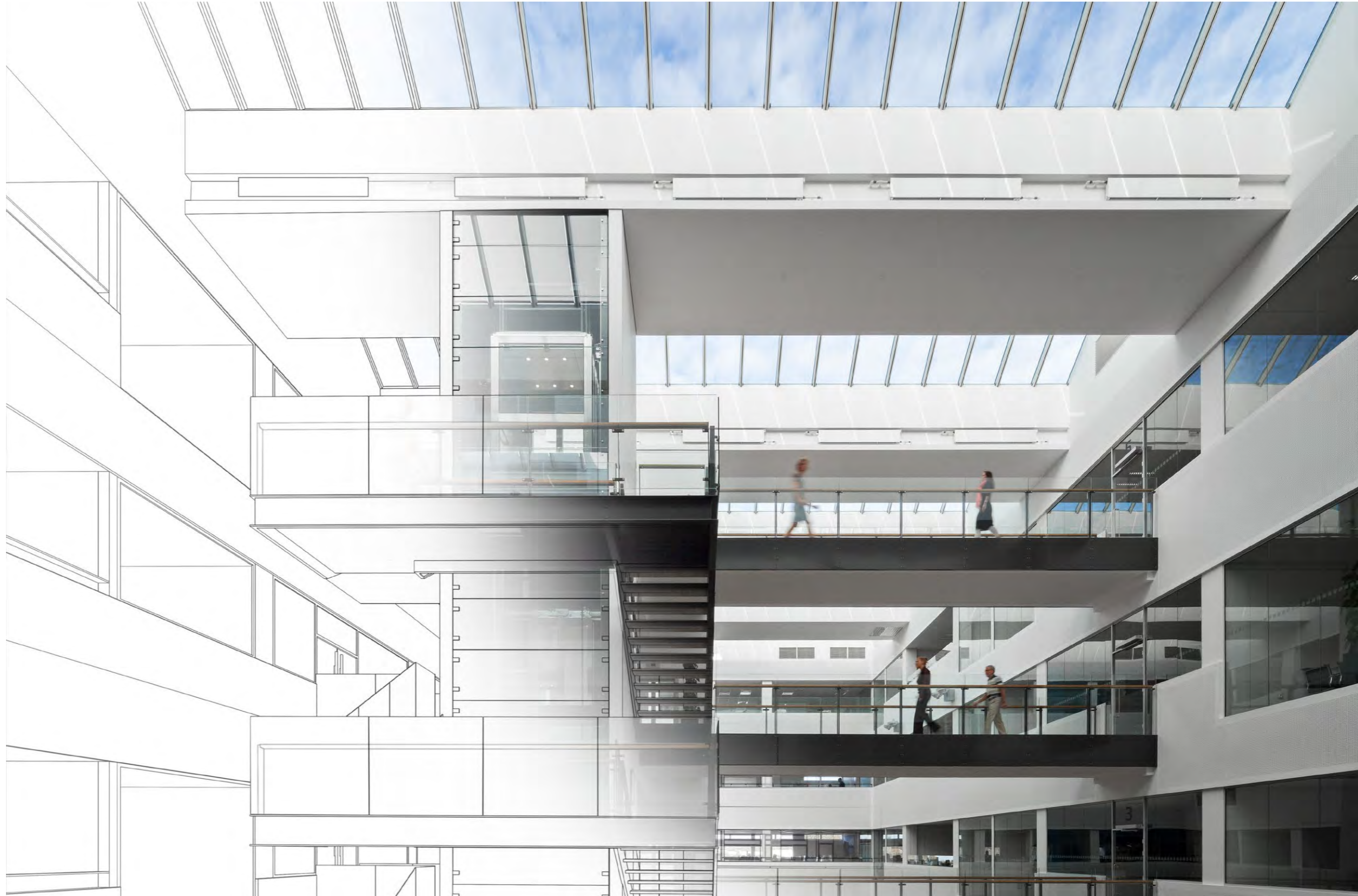
The Daylight Visualizer has been validated against the CIE 171:2006 test cases to assess the accuracy of lighting computer programs and passed all test cases dedicated to natural lighting.



## CAD/BIM

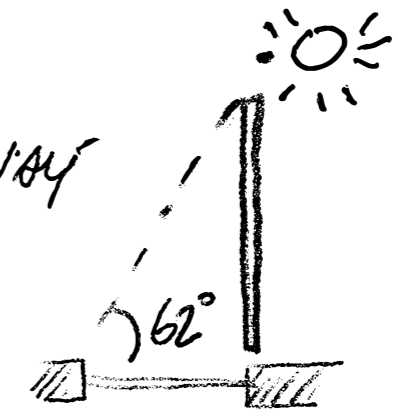
Take advantage of our CAD tools to create simple and visually appealing designs. VELUX Commercial BIM objects are available for the most popular modelling programs, including: Autodesk Revit, Graphisoft ArchiCAD and Nemetchek Vectorworks.

All 3D objects are compatible with Autodesk AutoCAD, Trimble SketchUp and 3D Studio/3DS.

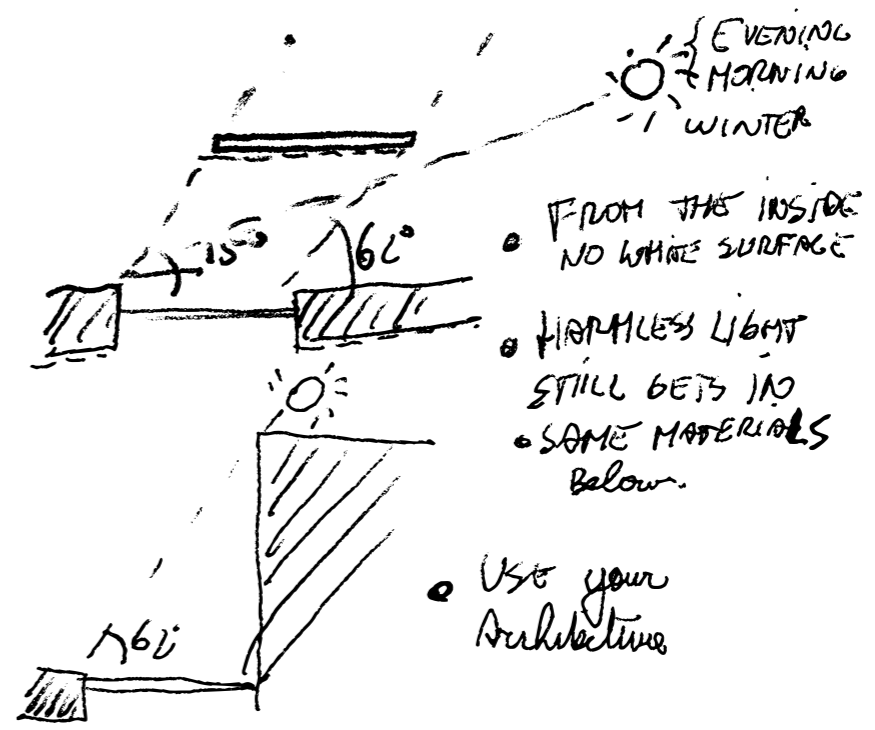




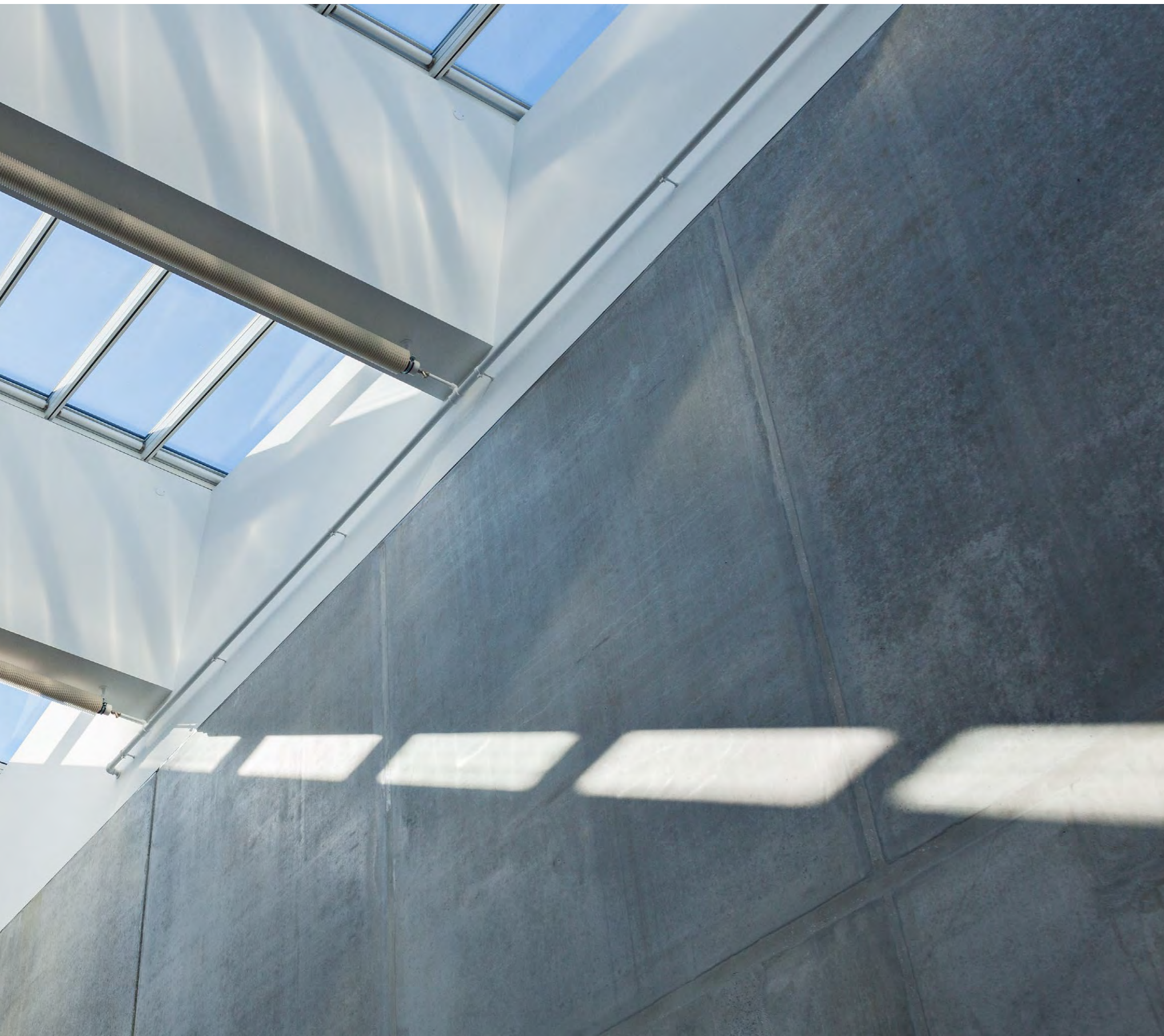
THERE ARE  
DIFFERENT WAY  
TO RECREATE A  
SHED ROOF



SUMMER / NOON







## Our purpose

Daylight and ventilation can play a key role in redefining how buildings are designed for occupants to enjoy. Incorporating daylight and fresh air into design improves the well-being of people, while also working to reduce energy consumption and CO<sub>2</sub> levels.

Benefitting the environment through sustainable building design, our rooflights are innovative daylight solutions that help to reshape architectural design approaches for new builds or refurbishments, transforming how spaces are used and enjoyed by building occupants.

## Who we are

VELUX Commercial was established in 2019, and comprises the former JET, Vitral and VELUX Modular Rooflights organisations. Now, VELUX Commercial operates as one company with 1,100 employees working in sales, production and administration across 13 countries.

VELUX Commercial provides a broad product offering of daylight and ventilation solutions for industrial, commercial and public buildings. The product program ranges from industrial flat roof and smoke and heat ventilation exhaust solutions to bespoke glazing and ongoing maintenance.



## "It's our nature"

### **Delivering sustainable goals**

The VELUX Sustainability Strategy 2030 is our roadmap for the 'decade of action'. How we operate and the products and services we bring to market is changing, and this will significantly transform the way we do business. Our sustainability strategy helps keep our own house in order and involves employees and supply chain.

Our pioneering commitment is to become Lifetime Carbon Neutral by 2041. This means taking responsibility for both our past and future carbon emissions.

### **Our strategy is threefold:**

#### **1. Secure a responsible business**

We will secure a responsible business for more diverse, inclusive, safe, healthy and innovative ways of working. We must keep our own house in order and live up to our model company objective.

#### **2. Innovate sustainable products**

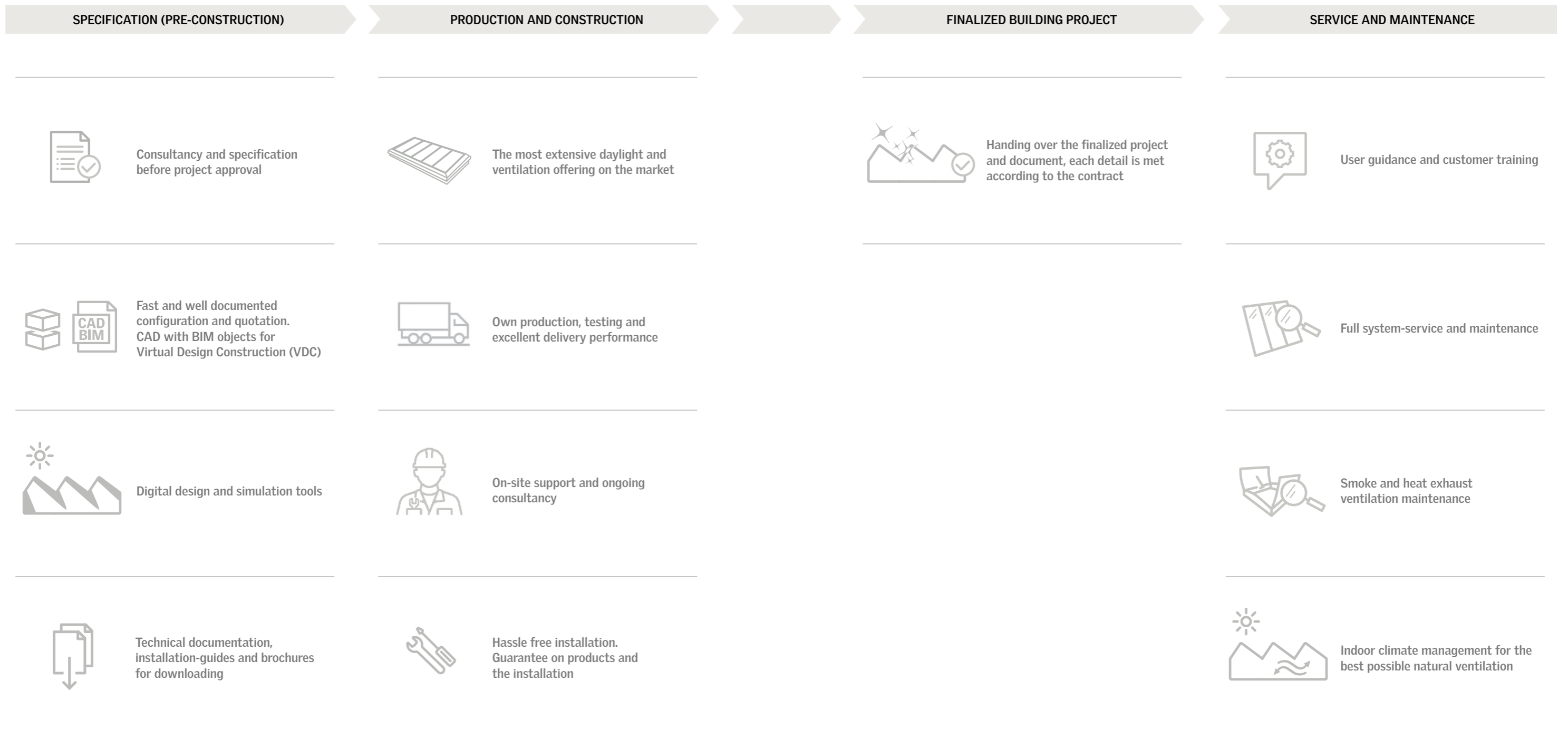
We will develop innovative and sustainable products to create better indoor spaces for people and the environment.

#### **3. Pioneer climate and nature action**

We will pioneer climate and nature action to become Lifetime Carbon Neutral and showcase sustainable buildings and communities.



## Our services



**VELUX Group**  
VELUX Commercial  
Ådalsvej 99  
2970 Hørsholm  
Denmark

Email: [vms@velux.com](mailto:vms@velux.com)  
Web: [veluxcommercial.com](http://veluxcommercial.com)  
Blog: [commercial.velux.com/blog](http://commercial.velux.com/blog)

**Photographers:** : Jesper Blæsild, Jasper Leonard, Mads Frederik – Architectural Photography, Storm Production, Adam Mørk, Cepezed | Lucas van der Wee, Christian Alsing, Laura Stamer – STAMERS KONTOR, DSL Studio – Marco Cappelletti, Jack Hobhouse, Ronald Auée, Gregory Halpern, Dirk Linder, René Løkkegaard Jepsen – Itchy Copenhagen, Jürg Zimmermann – zimmermannfotografie, Jesper Jørgen, Martin Sølyst, Adobe Stock, Gettyimages, Dick Holthuis, Marcel Rickli, AHR Architects, Peter Witt, RoosRos Architecten, Mads Frederik – Architectural Photography, VELUX Commercial

