7 SUSTAINABLE OFFICES

DESIGNING BETTER WORKPLACES WITH DAYLIGHT AND FRESH AIR

SUSTAINABLE CERTIFICATIONS MATTER

Sustainable buildings enhance the wellbeing and productivity of people working, learning and recovering in them.

INTRODUCTION

Sustainable building certifications help shift the industry and drive innovation by formalising design and performance criteria.

Certified buildings with VELUX Modular Skylights
Sustainability is a fundamental part of the VELUX way of doing business. We continuously seek to minimise our footprint and want to lead the development of healthy & sustainable buildings, in close cooperation with clients, designers and planners in the building industry. With this collection of sustainability certified buildings, we seek to provide guidance of building schemes and feature our VELUX Modular Skylights.

Why certification matters
Certified buildings are characterised by their commitment to sustainability and the experienced quality and comfort from the perspective of the end user. This is especially prevalent during the design phase. Key components that secure the quality of the building are always prioritised; Regardless of which certification system is applied, lots of daylight and fresh air is a must. The wellbeing of the people working in the building is considered in every part of the design process.

Sustainable design for human well-being
VELUX Modular Skylights can apply to any certification scheme, and contribute to a healthy indoor climate, which is paramount for the performance of not only the building, but in particular of the users. Sustainable design involves more than building performance alone, it must also account for human well-being.

The examples in this collection seek to increase knowledge and provide inspiration to designers and planners.

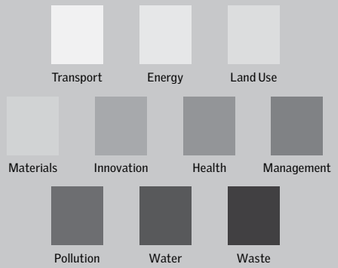
SUSTAINABLE BUILDING CERTIFICATIONS ARE TOOLS WE CAN USE TO MEASURE AND DOCUMENT SUSTAINABILITY AS WELL AS SUPPORT INTEGRATED DESIGN

This overview shows the eight planning tools and their respective structures at a glance. Most of the tools pursue a holistic strategy that encompasses energy and other environmental issues as well as indoor climate. Life cycle costing also plays a role in the DGNB and AktivPlus 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 or AktivPlus, put a stronger emphasis on planning guidance.

BREEAM

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

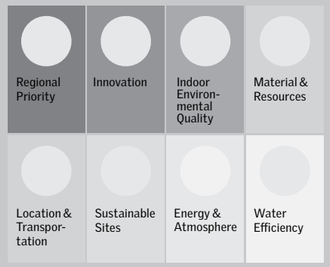
Structure



LEED

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

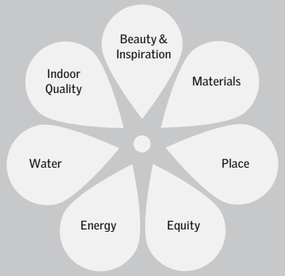
Structure



THE LIVING BUILDING CHALLENGE

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

Structure



DGNB

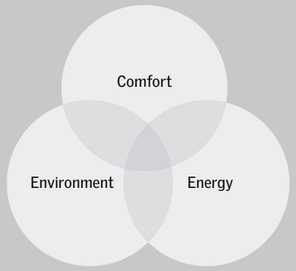
Initiated by	German Sustainable Building Council (Deutsche Gesellschaft für Nachhaltiges Bauen/DGNB)
Year	2008
Website	www.dgnb.de

Structure

ACTIVE HOUSE

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

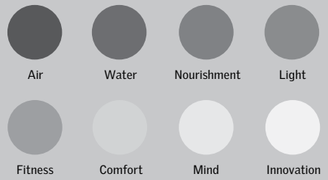
Structure



WELL BUILDING STANDARD

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

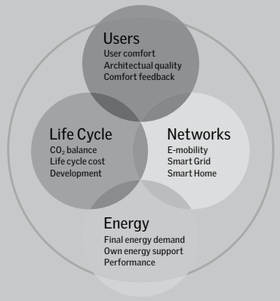
Structure



AKTIVPLUS

Initiated by	AktivPlus e. V.
Year	2014
Website	www.aktivplusev.de

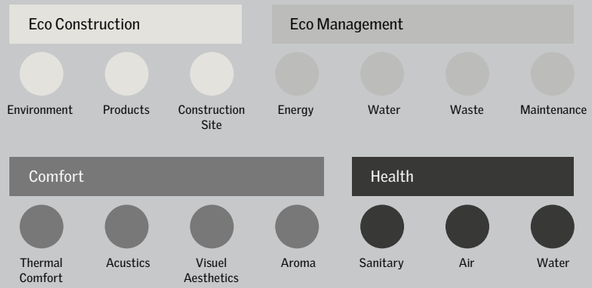
Structure



HQE

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

Structure



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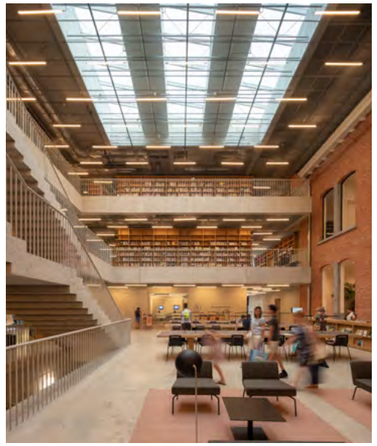
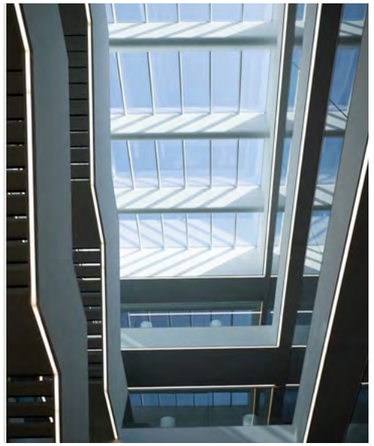
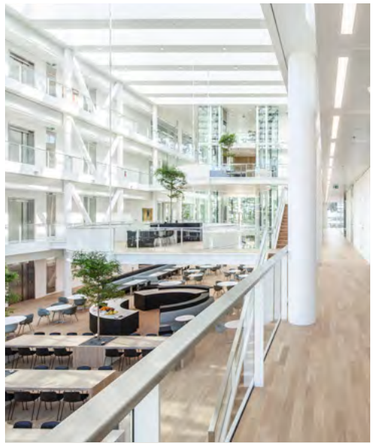


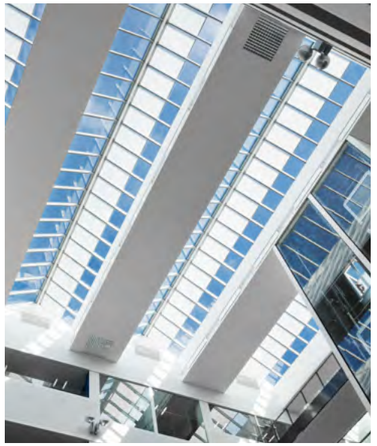
BIBLIOTHEEK UTOPIA
BELGIUM
(BREEAM EXCELLENT)



DZNE
GERMANY
(BNB GOLD)

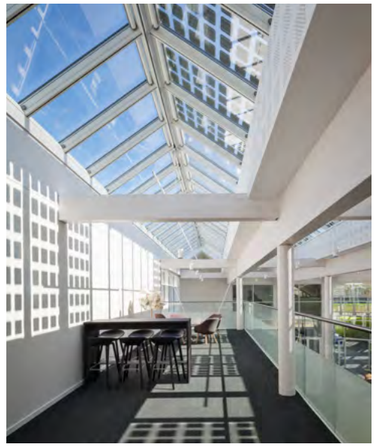


GENMAB
THE NETHERLANDS
(BREEAM EXCELLENT)

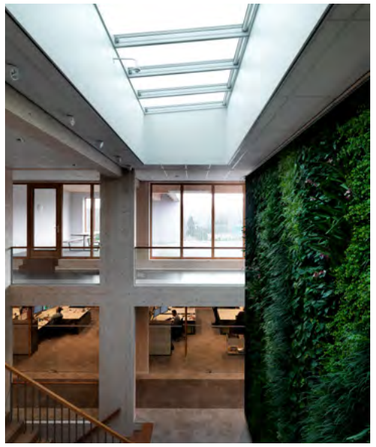


SIEMENS HEAD OFFICE
DENMARK
(LEED GOLD)

ENERGY TRANSITION COMPANY
THE NETHERLANDS
(BREEAM EXCELLENT)



GREEN SOLUTION HOUSE
DENMARK
(DGNB GOLD & ACTIVE HOUSE)



GEELEN COUNTERFLOW
THE NETHERLANDS
(BREEAM OUTSTANDING)

UTOPIA, A LIBRARY AND ACADEMY FOR PERFORMING ARTS

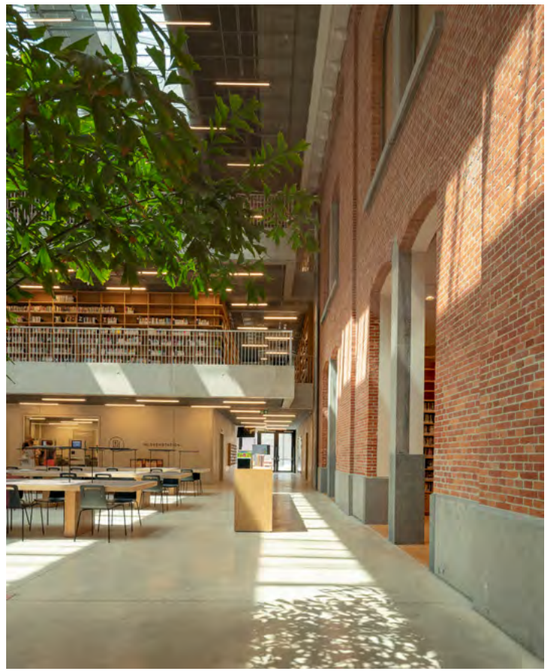
Architects: KAAN Architecten
Location: Aalst, Belgium

Certification: BREEAM Excellent

LIGHT AND FRESH AIR FOR EXPLORING

Taking its cue from Thomas More's acclaimed book "Utopia", first printed by prominent Aalst citizen Dirk Martens, the new building has been slotted into the urban fabric to enhance the characteristic irregular streets and intimate spaces of the city centre, and to interact with them. Both outside and inside, the historic façades blend perfectly with the generous spaces, while the brickwork dialogues with light grey concrete elements.

The entrance to the building is located on an intimate square between the reading café and the auditorium. Moving through the wide hall, the open interior landscape of the building unfolds from floor to ceiling, and cantilevered into the space are several thick concrete floors that appear to float. Hanging at varying heights, each level features bookshelves and reading tables, while looking into the atrium and towards the brick façade of the pre-existing building. The bookcases are pushed up against concrete discs which allow the floors to cantilever out without extra support. Mimicking the treads, the stairs zig-zag upwards, giving the staircase a sculptural presence at the periphery of the magnificent atrium and reading room.



The ceilings have been minimalized to the point of being almost undetectable. All the technical systems are concealed behind a stretched metal-coloured mesh that softens the strong daylight and creates a pleasant atmosphere during the day.

Within the new building, the ballet room, rehearsal studios and teaching spaces have windows as tall and wide as the rooms themselves, providing a view onto the city and a glimpse inwards from the city, while giving expression to the façade composition.
Acoustics was a fundamental design tool for KAAN Architecten: the reading in the Library should not be disrupted by music lessons and play's rehearsals. Suspended concrete floors replace the original wooden floors, doors are transformed into sound barriers, and double glazed windows capture each single piano note.

Utopia's openness also exudes sustainability. The building has achieved a BREEAM Excellent rating: materials and labour were locally sourced, low-energy machines were used for construction, solar panels, geothermal heat, skylights and LED lighting have been integrated in the design, rainwater is recuperated and buffered, and 230.000 bricks were chipped away and reused elsewhere.

The desire of KAAN Architecten to interact with the urban fabric has been achieved: Utopia is already a reference point in Aalst city center, with citizens eager to enjoy and welcome a new landmark in their everyday lives.

RENOVATION CASE: Bibliotheek Utopia

LOCATION: Aalst, Belgium

ARCHITECT: KAAN Architecten
INSTALLER: MEIRE NV
CONTRACTOR: Van Roey

VELUX MODULAR SKYLIGHTS:
One Atrium Longlight
PRODUCTS: 64 modules

PHOTOGRAPHERS:
Jasper Leonard
Delfino Sisto Legnani
Marco Cappelletti

DZNE, GERMAN CENTRE FOR NEURO-DEGENERATIVE DISEASES

Architects: Wulf Architekten GmbH
Location: Bonn, Germany

Certification: BNB Gold

CHALLENGING DESIGN MEETS SIMPLICITY AND PERFORMANCE

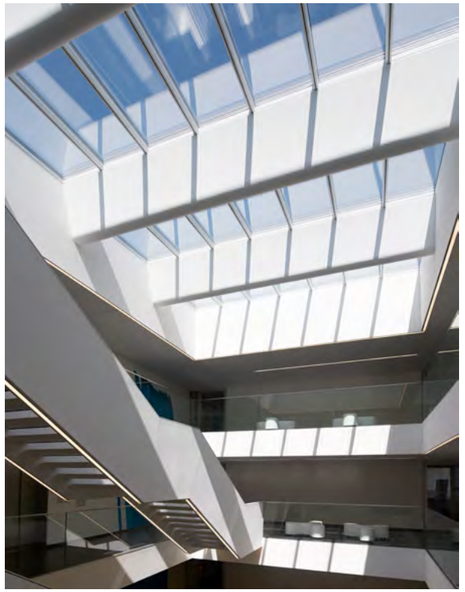
Welcome to the DZNE (German Centre for Neurodegenerative Diseases). Here, teams of scientists work on groundbreaking treatments for brain disorders such as Parkinson's and Alzheimer's, while patients receive treatment on site, and the administration team manages projects relating to this facility and the broader DZNE network.

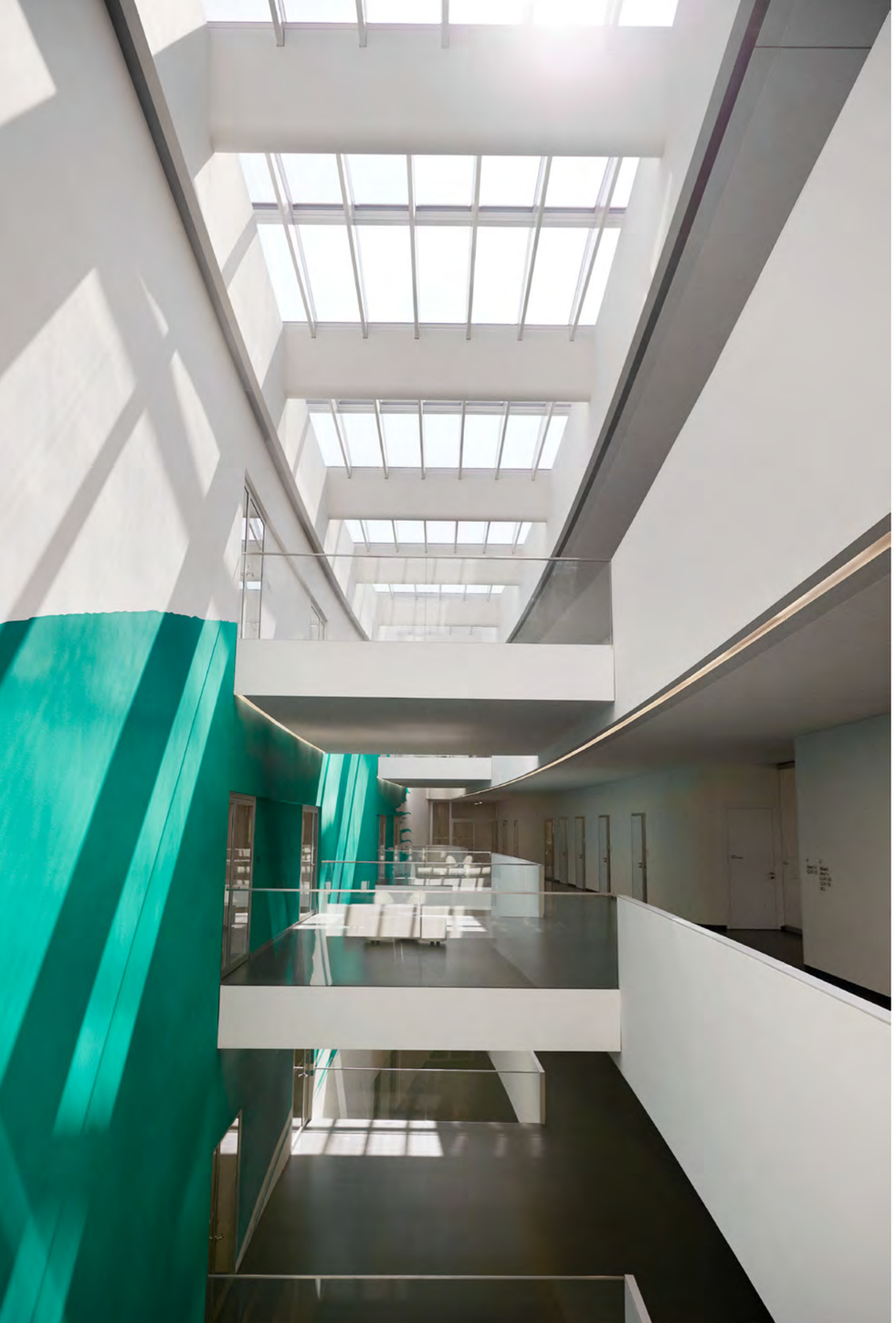
The challenge: Uncompromising design and functionality

When Stuttgart-based Wulf Architekten won the tender for this project, one of the main priorities was to create an inspirational design that would provide the ideal distribution for the work being undertaken at the centre. It should also provide bright communal spaces, while respecting the building's natural surroundings. First and foremost, there was to be no compromise on design, to ensure that DZNE Bonn would be a point of reference, both professionally and architecturally.

The solution: Designing with daylight to bring spaces to life
The building was designed in the form of three, interconnected buildings, each with its own purpose (laboratory, clinical studies, administration). It should cause minimal disruption to the beautiful trees surrounding it – these would play an integral role in the building, providing a stunning natural backdrop. At the same time, the external sunscreening on the building is designed in progressively changing shades of red, orange, yellow and green, which recreate the changing seasons. On the inside, one of the key ingredients for the design was to be daylight.

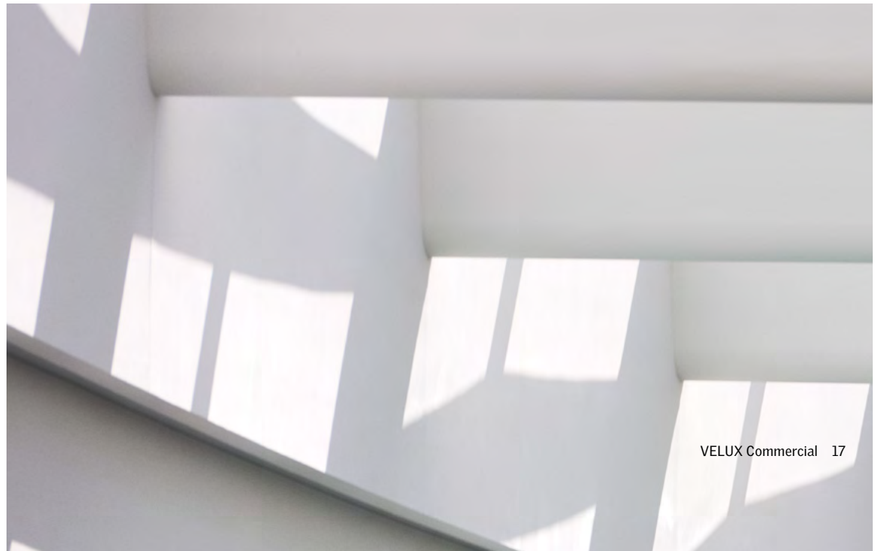
Atrium one
The first of the two atriums is to be found at the entrance to the Centre. You immediately notice the abundance of daylight, and looking up, you see the source of that daylight – rows of minimalist, low-profile skylights supported by unique, custom-designed beams.





Atrium two
The second atrium is perhaps more impressive still. The main laboratory building is built in the form of an oval, and has an atrium running its entire length. At the top of the atrium, there is an oval-shaped glass roof – a true signature feature that calls to mind the hull of a ship. Creating this was to be a significant architectural challenge, but together with VELUX Modular Skylights, the architects were able to bring the design to life. The skylights are actually mounted above the oval structure, to give these stunning results.

Both atriums make use of VELUX Modular Skylights.



Wulf Architekten decided to work with VELUX Modular Skylights on the project for three main reasons:

1. The versatility of the modular solution meant that it would work, even with the unusual roof designs of the two atriums, allowing for these signature features to be included in the project.

2. The low-profile frames of the modules and 100% concealed mechanicals mean that there is no compromise on design and aesthetics.

3. The glass roof looks completely fixed, but you can actually open every second module remotely to provide active cooling and a good indoor climate for the building. There is no difference in appearance between fixed and opening modules, so the design is not compromised.

> LIGHT IS ONE OF THE MAIN TOOLS OF AN ARCHITECT. IT'S ONE OF THE THINGS THAT MAKES THE DIFFERENCE BETWEEN AN IDEA AND A PIECE OF ARCHITECTURE.

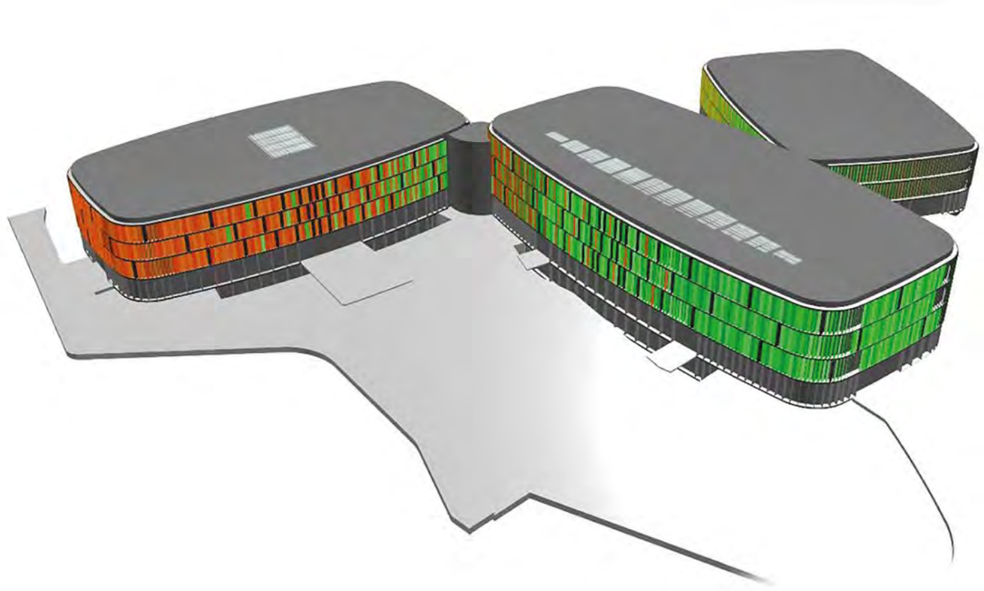
Steffen Vogt
Managing Partner at
Wulf Architekten GmbH

"WHEN YOU COME IN, YOU CAN SEE THE SKY, OPEN YOUR MIND, AND FEEL PROUD OF YOUR WORKPLACE. I THINK IT'S AN AMAZING BUILDING.

Camille Brosset,
DZNE Administration

"NOWADAYS ON A CONSTRUCTION SITE, EVERYTHING IS A PROBLEM. BUT HERE, AFTER A COUPLE OF DAYS, THE GLASS ROOF WAS JUST THERE! NO PROBLEM, NO DRAMA.

Steffen Vogt
Managing Partner at
Wulf Architekten GmbH



The result: Energy, inspiration and pride

With DZNE, Wulf succeeded in achieving the design-focussed remit of the client, while delivering a high-performing building that is a new landmark on its campus. While the facilities meet and exceed expectations, perhaps the greatest achievement is the happiness and pride experienced by employees at the facility. They particularly note the enjoyable communal spaces and the positive contribution played by lots of daylight and fresh air in bringing energy and inspiration to their working lives.

NEW BUILD CASE: DZNE, German Center for Neurodegenerative Diseases

LOCATION: Bonn, Germany

ARCHITECT: Wulf Architecten GmbH
CONTRACTOR: MIROTEC Glas- und Metallbau GmbH

VELUX MODULAR SKYLIGHTS: One Atrium Longlight + One Atrium Ridgelight at 5° with Beams
PRODUCTS: 28 modules + 110 modules

PHOTOGRAPHER: Jesper Blæsild

GENMAB, RESEARCH FACILITY OF BIOTECHNOLOGY

Architects: CEPEZED
Location: Utrecht Science Park, The Netherlands

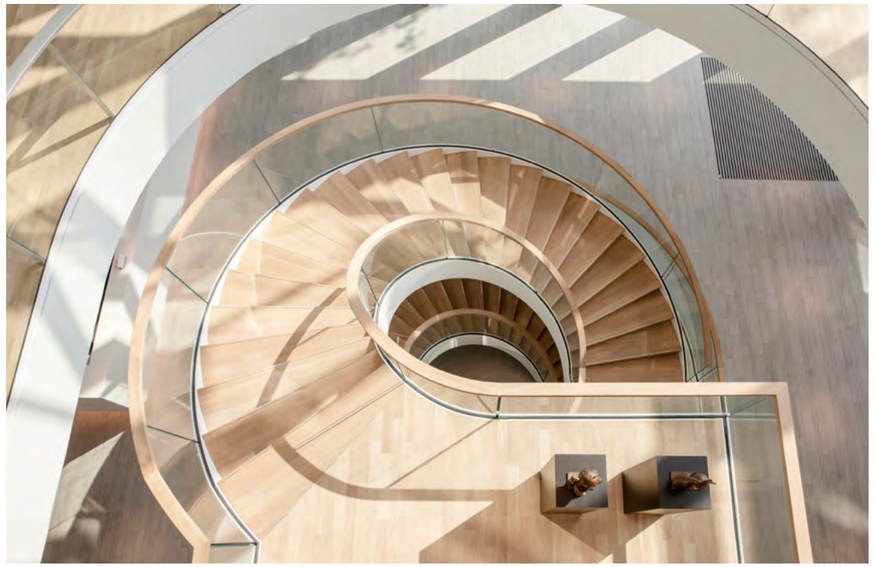
Certification: BREEAM Excellent

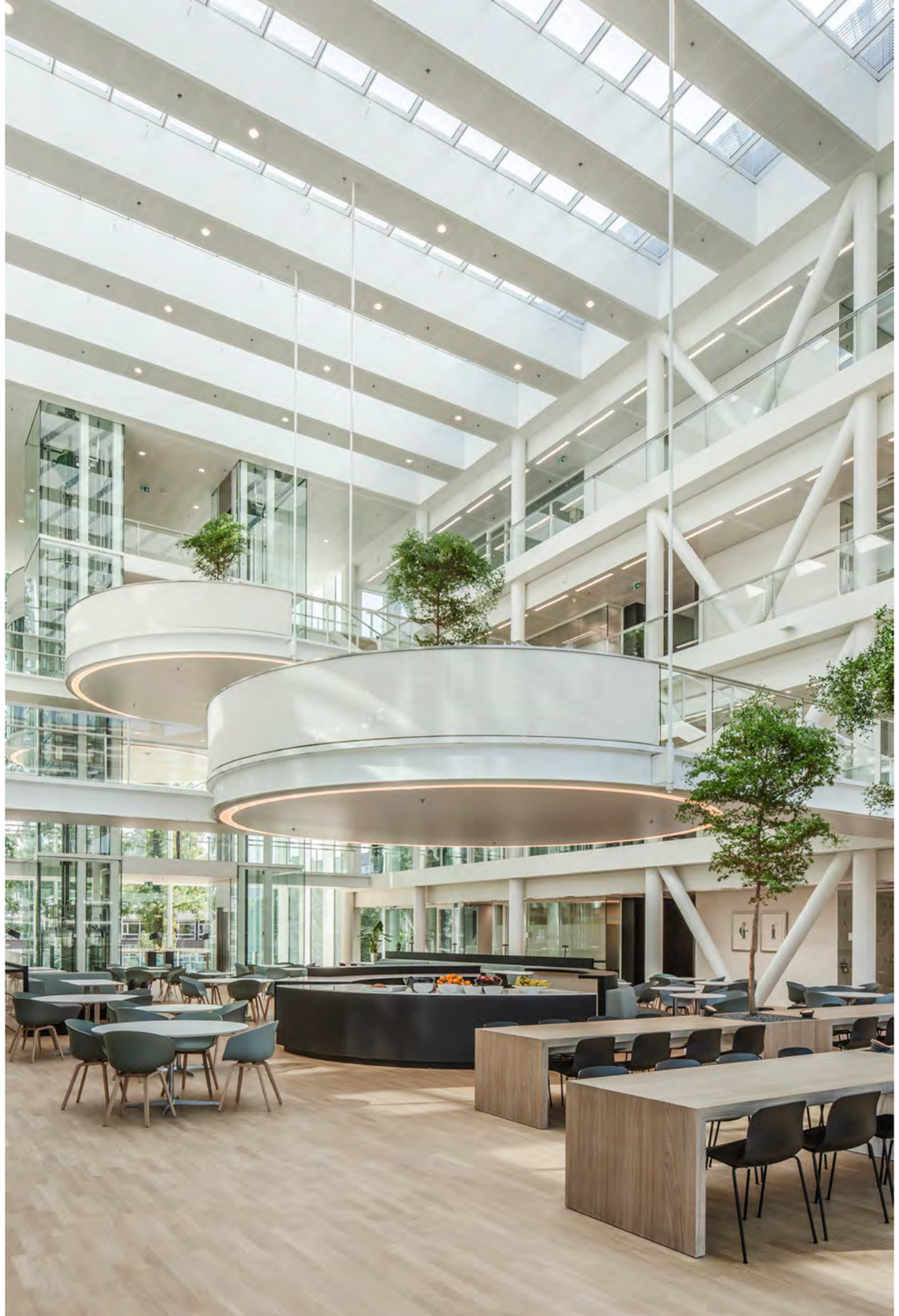
NEW RESEARCH & DEVELOPMENT CENTRE AT UTRECHT SCIENCE PARK

Genmab's new Research & Development Centre at Utrecht Science Park is developed and delivered by construction company Dura Vermeer. The new research facility consists of offices, laboratories and facilities such as a science café, a square with a company restaurant and an auditorium with a capacity of 200 people. The premises, which encompasses around 11,250 m^2 including an underground car park, were designed by the architectural firm Cepezed. This design is distinguished by the centrally located transparent atrium featuring cascading, free-hanging platforms. The big atrium contains of 128 Longlight Modules from VELUX Modular Skylights.

The Science Park is a crucible that brings together innovative knowledge, science and business. For this reason, the ground floor of Genmab's new R&D centre will feature a science café and auditorium, to provide a space where knowledge can be shared with other residents of the Science Park.

Already in the planning phase of the building, the ambition was to achieve BREEAM Excellent status, and a range of technological measures have been taken to boost the sustainability of the building. For example, the heating and cooling system uses sustainably generated energy via an underground geothermal heating system. The building is designed to be energy efficient, with excellent roof and outer-wall insulation and LED lighting which is activated by motion sensors and dimmed in daylight hours (except in the laboratories). The ventilation is balanced with attention paid to heat and fluid retention.





The ventilation of meeting rooms, the restaurant, science café and auditorium will be controlled based on CO_2 values to prevent unnecessary ventilation. Furthermore, the building is flexibly divisible with regard to climate and lighting control. On the roof, electricity is generated by approximately 300 m^2 of solar panels, which help power the building. Genmab is awarded with the BREEAM Excellent status and is the first research centre in the Netherlands to achieve a BREEAM Excellent laboratory environment.

NEW BUILD CASE: Genmab Research & Development Centre

LOCATION: Utrecht Science Park, The Netherlands

ARCHITECT: CEPEZED
INSTALLATION: Lenco Projects
CONTRACTOR: Dura Vermeer Utrecht

VELUX MODULAR SKYLIGHTS:
One Atrium Longlights
PRODUCT: 128 modules

PHOTOGRAPHER:
Lucas van der Wee (cepezed)

INTERIOR ARCHITECT:
cepezedinterieur

SIEMENS HEAD OFFICE

Architects: Arkitema Architects
Location: Ballerup, Denmark

Certification: LEED Gold

A BUILDING FOR THE MODERN AGE

Design approach
The new Siemens Denmark headquarters replaces the former office building of the technology company, located on the same site in a suburban industrial area west of Copenhagen. 900 employees work inside the abstract, five-storey cube, which is clad with white and dark grey concrete panels on the outside. Inside the building, the reception, canteen, showrooms and seminar rooms are located on the ground floor, while offices occupy the majority of the upper floors.

A central, full-height atrium supplies the interior with daylight through six glazed ridgelights, each measuring 17 metres in length, which comprise a total of 228 fixed modular skylights.

Shading in the central space is provided by awnings that are automatically controlled by sensors depending on seven different parameters, including the position of the sun and the lux levels in the atrium.

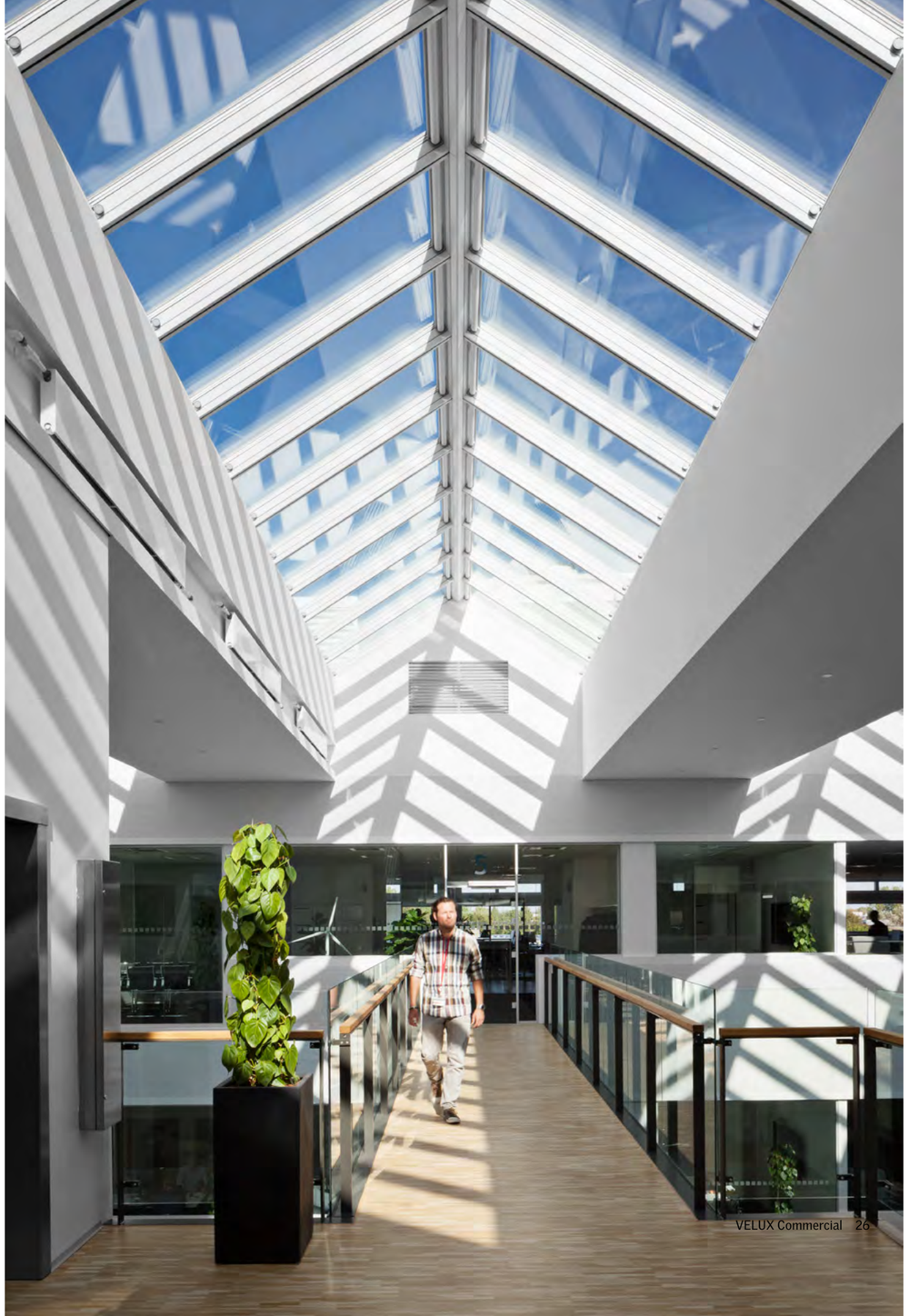
Evaluation concept
The Siemens headquarters was one of the first buildings in Denmark to achieve LEED Gold certification. The building has been equipped with temperature-, CO_2 -, and electricity sensors from the beginning. This allows the facility management team to monitor the energy consumption in the building, as well as the indoor comfort in any room they choose to, and adjust the systems accordingly.

"THE VALUE OF A BUILDING DEPENDS ON THE QUALITY OF THE TECHNOLOGY AND THE SOLUTIONS THAT ARE USED TO MANAGE THE BUILDING.

LIGHT, VENTILATION, SAFETY ETC. MUST PLAY TOGETHER IN ACCORDANCE WITH THE PURPOSE OF THE BUILDING – WHETHER IT IS USED FOR LEARNING, DEVELOPMENT, TREATMENT OR GROWTH.

DATA PLAYS A VITAL ROLE IN THAT INTERPLAY. AND THERE'S NO DOUBT IN MY MIND THAT IT WILL COME TO PLAY AN EVEN BIGGER ROLE.

Jesper Skov
CEO, Siemens Building Technologies



Results
So far, the selective monitoring has allowed the technicians to understand the thermal behaviour of different spaces much better and to fine-tune the cooling and ventilation systems. The diagrams below are an example: they show the CO_2 levels and indoor temperature in a meeting room for 30 days in March 2018. Both curves rise rapidly once the room is occupied, but only to the point where the ventilation system (which is controlled by sensors) automatically reacts by increasing the volume, as well as lowering the temperature, of the incoming fresh air.

THE LEED CERTIFICATION ALSO INCLUDES AN EVALUATION OF THE VOLUME OF DAYLIGHT IN THE BUILDING, WHICH CAN BE DIFFICULT TO PREDICT AT THE PLANNING STAGE.

TO HELP DOCUMENT THE EFFECT, THE VELUX GROUP HAS DEVELOPED A NUMBER OF BUILDING TOOLS, WHICH CAN BE USED TO SIMULATE THE IMPACT OF THE MODULAR SKYLIGHTS.

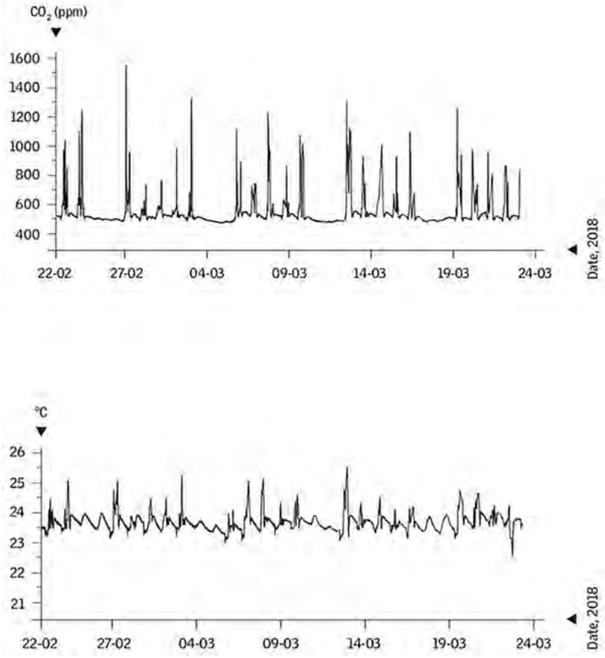
NEW BUILD CASE: Siemens Head Office

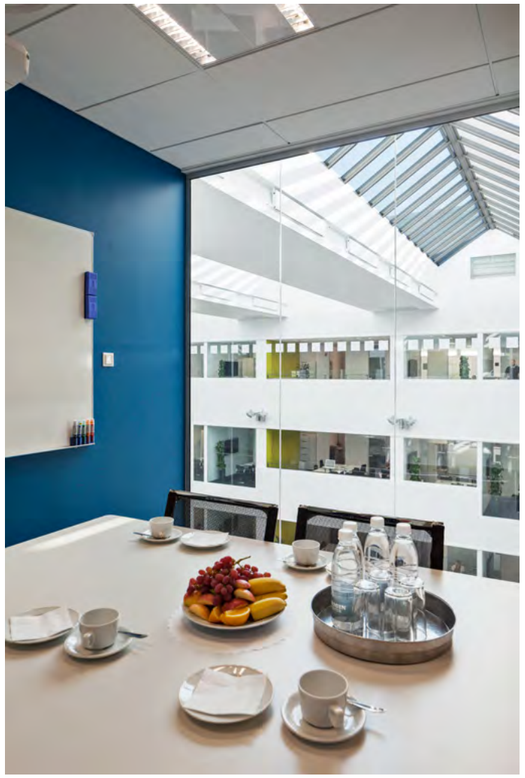
LOCATION: Ballerup, Denmark

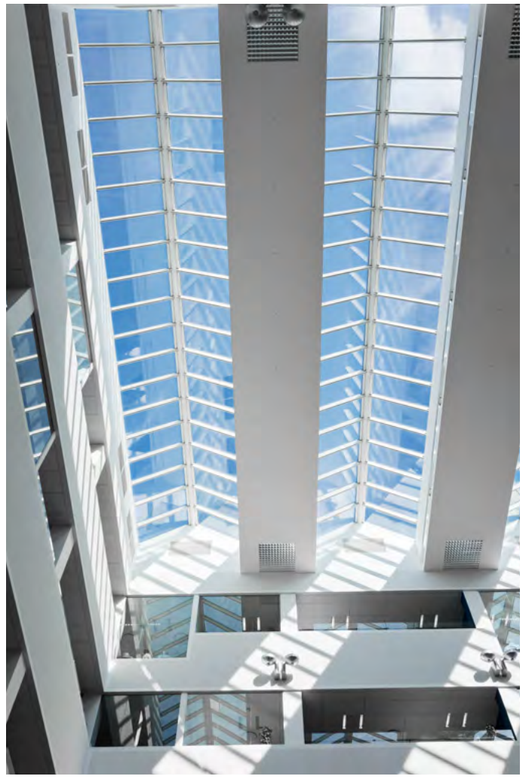
ARCHITECT: Arkitema Architects A/S
INSTALLATION: Wulff ApS
CONTRACTOR: KPC København A/S

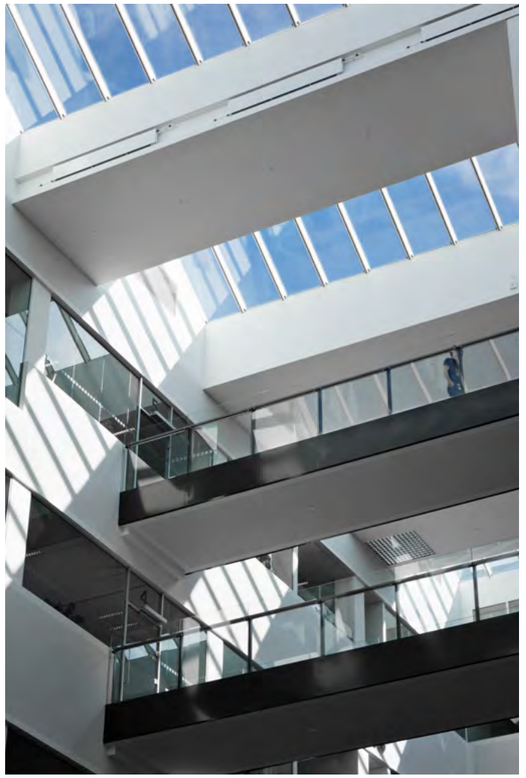
VELUX MODULAR SKYLIGHTS:
One Atrium Ridgelight
PRODUCT: 228 modules

PHOTOGRAPHER: STAMERS KONTOR









> IT PRODUCES A NICE INDOOR CLIMATE AND A LOVELY BRIGHT INTERIOR. OF COURSE YOU SENSE THE SPACE AROUND YOU, BUT THE DAYLIGHT IS REALLY WHAT STRIKES ME

Michael Palne,
Key Account Manager, Siemens A/S

ENERGY COMPANY

Architects: Sacon B.V.
Location: The Netherlands

Certification: BREEAM Excellent

THE ENERGY-NEUTRAL ENERGY COMPANY

In this transmission system operating company, it was a fundamental design intent to achieve an energy-neutral new construction, while enhancing the well-being of the employees and the of environment. The sustainability level has been measured according BREEAM standards, and has achieved a rating of Excellent.

Due to an angular rotation in the facade, the building element subsequently links up with the side-street. A garden, situated on this side of the building, was created around the existing large trees. In line with the garden, lies a green lung that supplies light, air and space to the office building. At the back, the building turns towards the water following an overhang.

The sculptural façades, inspired by a work of Delft artist Jan Schoonhoven, are made from composite material, and are prefabricated for efficient installation on a modular construction system that is disassemble-able and recyclable at the end of its life. The shape and positioning of the windows limit direct sunlight around midday during the summer, while providing generous pleasant daylight for working throughout the year. The arrangement protects the highly-insulated building from solar gain, while ensuring that every employee can enjoy the view.

Within the building, the central atrium is especially remarkable.
It functions as a 'green lung', a mitigated outdoor climate from which fresh air can be drawn for ventilation. This atrium is the heart of the building: together with a patio, it offers a place for workers of all levels to gather together.

Throughout the complex, temperature is controlled through radiant ceilings, adjusted individually for maximum efficiency and comfort. Low-energy lighting is installed in combination with daylight control and presence detection. Together, these measures have resulted in a highly energy-efficient building.
To reach a zero energy performance coefficient, photovoltaic cells (PV) have been placed on the roof to fulfil the remaining energy demand. Any surplus electricity, of course, can simply be fed into the operating company's own public energy transmission network.

RENOVATION CASE:
Energy transmission system operating company

LOCATION: The Netherlands

ARCHITECT: Sacon B.V.
CONTRACTOR: Combinatie Trebbe/van Wijnen

VELUX MODULAR SKYLIGHTS:
One Atrium Longlight
PRODUCTS: 64 modules

GREEN SOLUTION HOUSE

Architects: GXN Architects
Location: Rønne, Denmark

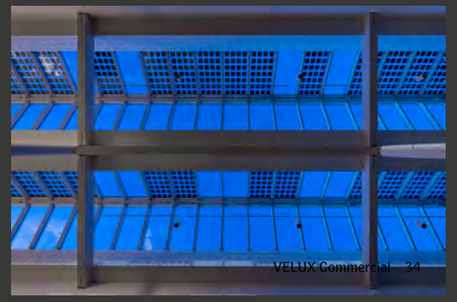
Certification: DGNB and Active House

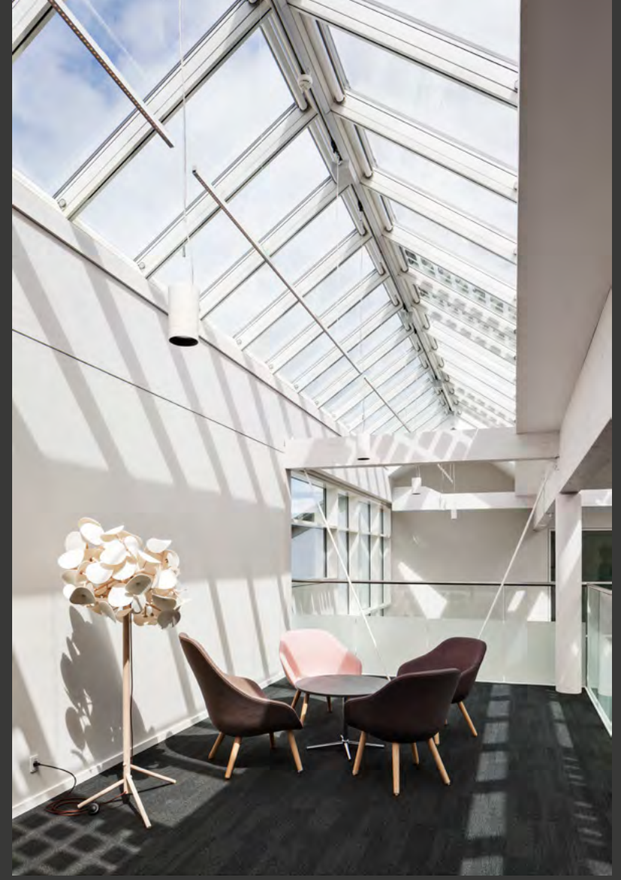
A bright idea based on sustainability
Green Solution House is a conference centre and hotel, based on sustainable ideas and Cradle to Cradle principles. Situated on the island of Bornholm, Denmark, the centre opened to the public in 2015 following a comprehensive renovation project that included the construction of four large extensions which include innovative meeting facilities and auditoriums.

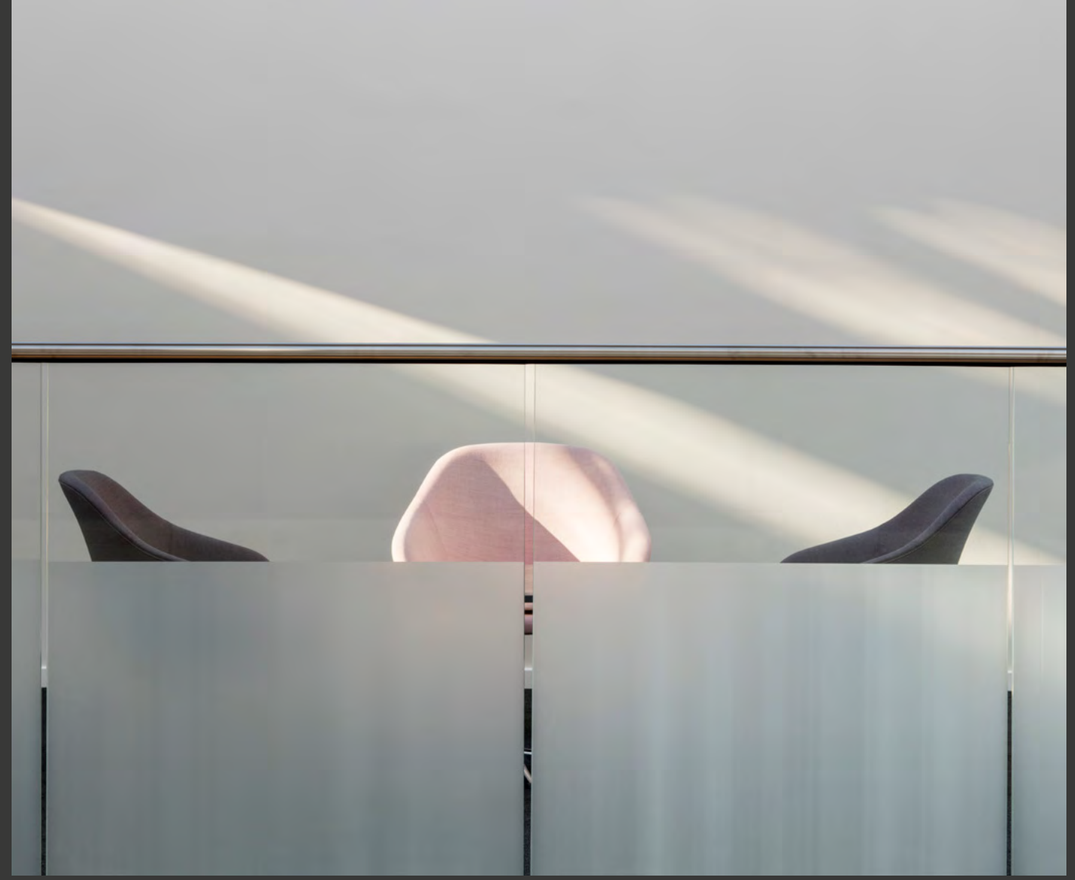
To ensure plenty of daylight and ventilation a selection of VELUX ridgelight solutions were installed in the expanded atrium and reception area.

"HAVING A BRIGHT, DAYLIT CONFERENCE CENTRE IS OUR BEST SELLING POINT

Trine Richter, Director, Green Solution House







"OUR AMBITION IS TO ENHANCE PEOPLE'S WELL-BEING BY EMPOWERING PEOPLE WITH DATA AND QUANTIFYING THE BUILT ENVIRONMENT IN REAL TIME

Vinay Venkatraman, CEO Leapcraft

"GREEN SOLUTION HOUSE IS DESIGNED TO STIMULATE THE SENSES AND INCREASE THE COMFORT OF GUESTS AND EMPLOYEES

Kasper Guldager, Senior Partner 3XN, Director GXN

PHOTOVOLTIAC

To underpin the sustainability principles some of the VELUX Modular Skylight modules include built-in photovoltaic cells. Photovoltaic modules are designed to generate free electricity to the building and its users, creating a valuable supplement to the consumption of conventional power.

Also, a large number of single VELUX roof windows and domes were Introduced to ensure a pleasant indoor environment, mainly in hotel rooms, hallways and conference rooms.

RENOVATION CASE:
Green Solution House

LOCATION: Rønne, Denmark

ARCHITECT: GXN Architects
CONTRACTOR: PL Entreprise A/S

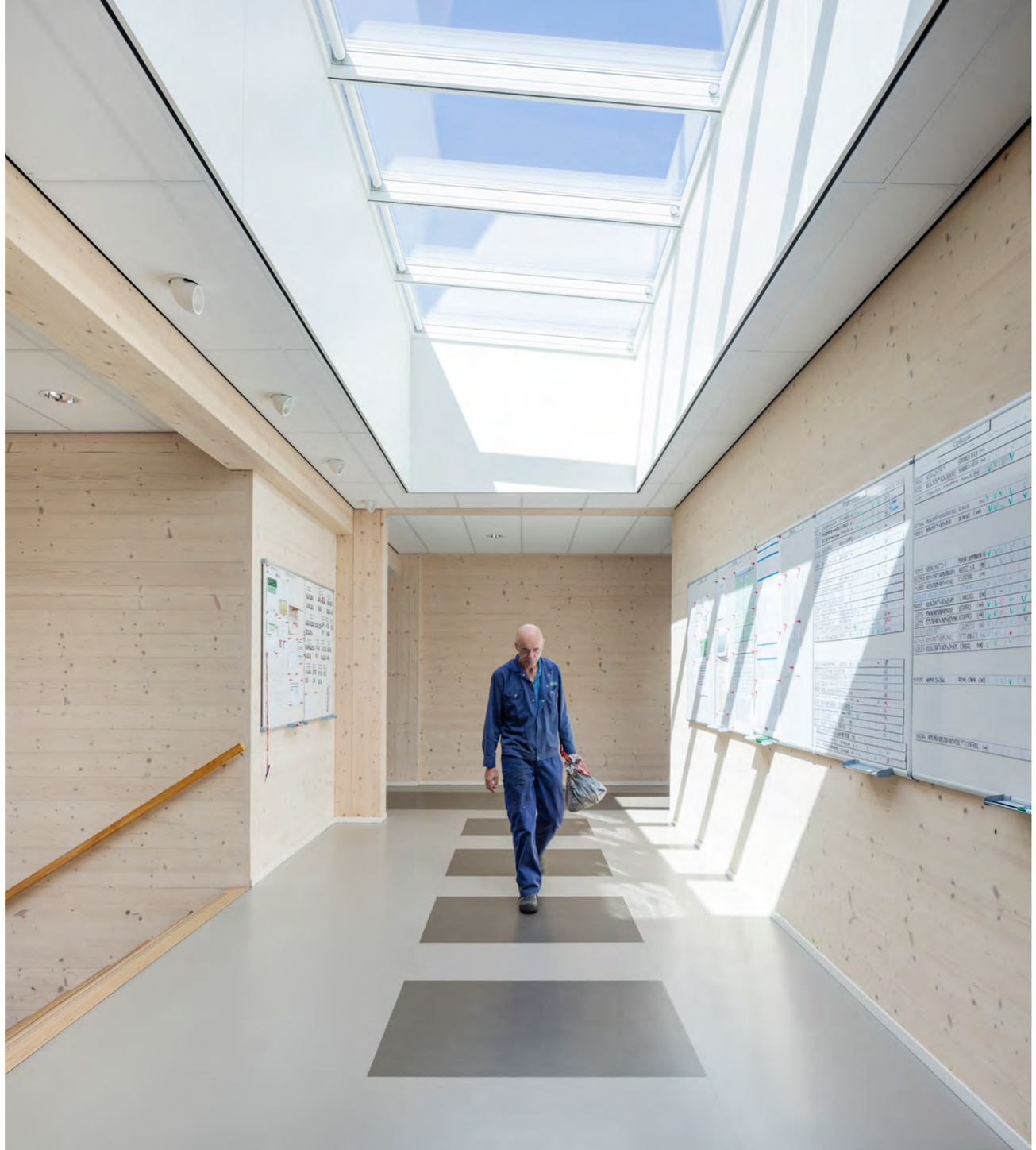
VELUX MODULAR SKYLIGHTS:
One Atrium Ridgelight
PRODUCTS: 196 modules

PHOTOGRAPHERS:
STAMERS KONTOR
Adam Mørk

GEELEN COUNTERFLOW

Architects: Architecten en Bouwmeesters
Location: The Netherlands

Certification: BREEAM Outstanding



Geelen Counterflow has won the 2017 BREEM award offices new construction
In 2016 the office already achieved the highest ever BREEAM certification score worldwide; 99,94%. In 2017, the office had to compete in front of a panel of 6 judges. Geelen Counterflow was chosen as the winner.

From the judge's report: "Robust team integration, including the supply chain, impressed the judges, as well as the attractive and innovative design and robust cradle-to-cradle approach".

The office of 2800 m2 offers workspaces for 50 office employees and a canteen for 140. It generates 50% more energy from its solar panels than the building needs for ventilation, heating, cooling, light and computing. The excess electricity is used in the Geelen factory next door for cutting of stainless steel and charging of electric forklift trucks and cars. During weekends, excess electricity is supplied back to the local grid of Leudal Energie, whose windmills also supply any deficits when the sun does not shine. However, the main reason for the high BREEAM score is the fact that the entire office is built out of massive timber, without adhesives. Walls and floors consist of 36 cm. thick wood from the Black Forest. The wood contains 2000 tons of absorbed CO2 as a result of which the office has a negative CO2 footprint. Rainwater is collected and used to flush toilets and to water the green wall in the heart of the building. An ecological garden around the building and parking spaces provides facilities for insects, birds, bats and frogs.

The BREEAM award 2017 was handed over by Michael Portillo to Managing Director Sander Geelen who accepted on behalf of the design team that consisted of Rob Wolfs and Ron Hochstenbach of Architecten en Bouwmeesters, Jos Wagemans of Wagemans Bouwadvies, Robert de Bourgraaf of Dubourgraaf and Ad van de Ven. Sander Geelen: "We hope that this office will serve as an example to other construction projects. Energy-neutral construction in massive timber is just one of the ways in which we can make a small contribution to keeping our planet

healthy for future generations."
Geelen Counterflow (Haelen, Netherlands) builds and installs dryers and coolers for the feed and food industry worldwide. It enables its customers to save up to 50% on energy. Since 2014, it has been working on the development of electrical dryers which save another 60-70% of energy and which can run on renewable energy only. Following successful testing in 2016, a market introduction is planned in 2017. The company's long term goal is to operate 100% sustainably.
BREEAM is the world's leading sustainability assessment method for master planning projects, infrastructure and buildings. It

addresses a number of lifecycle stages such as New Construction, Refurbishment and In-Use. Globally there are more than 558,700 BREEAM certified developments. Projects are certified in areas such as energy, health, materials, land use, water, waste, pollution and management.

RENOVATION CASE: Geelen Counterflow

LOCATION: The Netherlands

ARCHITECT: Architecten en Bouwmeesters
INSTALLATION: Geelen Techniek
CONTRACTOR: Wagemans Bouwadvies

VELUX MODULAR SKYLIGHTS:
Three Longlights
PRODUCTS: 18 modules

PHOTOGRAPHERS:
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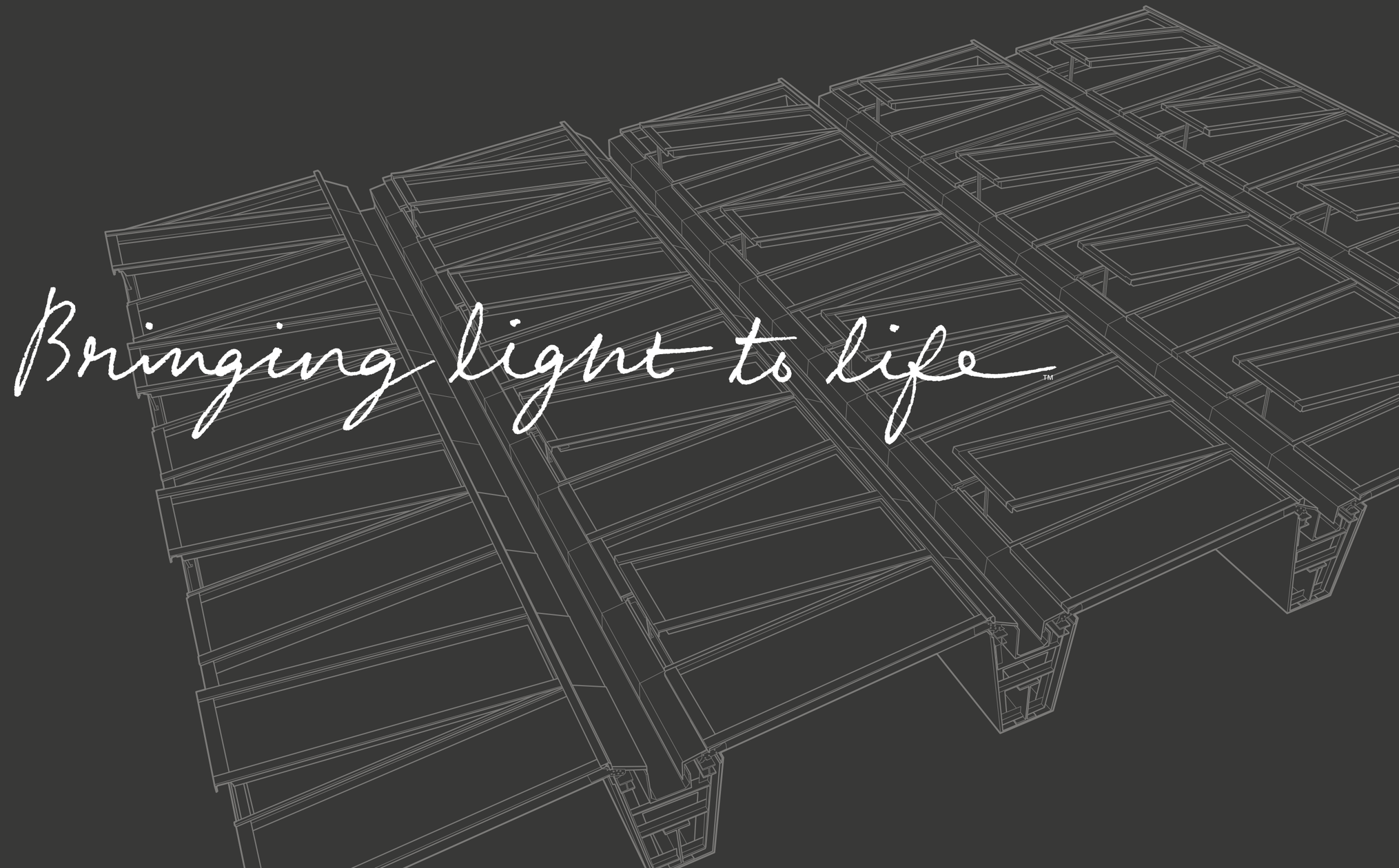

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