



ZENON®

## WHITE PAPER

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### Zenon® GRP Rooflights:

Sustainability from  
natural daylight in  
the built environment



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## Foreword

**Sustainability, energy efficiency and net zero carbon are the concepts that will be the fundamental drivers in the construction sector for decades to come. And rightly so, of course. We stand on an environmental precipice and must work flat-out to pull the world back from the brink of disaster. But I wonder, how well understood is the role of rooflights in the complex jigsaw of sustainable construction? I suspect there is room for progress.**

This White Paper assesses the current state of play in the broader sustainability landscape and then looks at how rooflights fit into this landscape. We believe it is time to accelerate our understanding and innovation, as well as educate widely about the comparatively unrealised potential of rooflights as a significant part of the sustainability solution.

This is a call to arms, a call for innovation and collaboration. We believe there is scope for companies within the sector to work together towards a common goal, while maintaining commercial boundaries. Our combined expertise can be used to raise knowledge levels among those who design, build, specify and fund new buildings and refurbishments.

This document is the first iteration of a White Paper that we expect to need to update regularly to keep pace with innovations and developments. Once you have read it, we welcome any feedback (see contact details on the last page) on ways to improve it and take it forward.

*Ian Weakford*

Sales and Marketing Director

# Executive Summary

**As global action to tackle climate change is finally becoming a more coherent set of commitments in order to avoid a climate catastrophe, the UK's focus is to hit net zero carbon emissions by 2050.**

Currently influencing 47% of emissions through its work, the construction industry has a huge part to play. While the headlines often go to landmark developments and domestic properties, every single part of this broad sector must contribute. That includes industrial and commercial property, both new build and refurbishment.

One critical part of the supply chain that has been under-used in the drive to lower both embodied and operational carbon in industrial and commercial buildings is rooflights.

A well-designed building with a good spread of natural light from rooflights will deliver passive solar gains that reduce both the heating energy demand and the need for artificial lighting - which, of course, can deliver a major reduction in a building's energy consumption and CO<sub>2</sub> emissions. Typically, the total CO<sub>2</sub> emissions associated with all aspects of operating a building without rooflights can be over 50% higher than for a building with 12% rooflights.

Collectively, across the UK, this adds up to a huge potential contribution to cutting carbon emissions - as well as increasing health and wellbeing.

Hambleside Danelaw's investment in research and development have resulted in the creation of new products that lead the way in rooflight sustainability. The company was the first UK industrial rooflight manufacturer to have had systems assessed and independently verified by the Building Research Establishment, leading to Environmental Product Declarations. Hambleside Danelaw has also developed an Embodied Carbon Calculator, which clearly measures the embodied carbon in rooflights, whatever configuration is used.

In partnership and in collaboration, the construction sector can harness this sort of drive for sustainability from every quarter, ensuring it beats a path towards net zero through innovation, expertise and determination. This White Paper gives the broader context of sustainability in the construction sector and demonstrates how rooflights can play a critical role. It is a key document for contractors, developers, architects and Government.

# Introduction

**In stating its Sustainable Development Goals, the United Nations notes that 2019 was the second warmest year on record and the end of the warmest decade (2010- 2019) ever recorded. Carbon dioxide levels and other greenhouse gases in the atmosphere rose to new records in 2019. Climate change is affecting every country on every continent. It is disrupting national economies and affecting lives. Weather patterns are changing, sea levels are rising, and weather events are becoming more extreme.**

At the Paris climate conference (COP21) in 2015, governments from 195 countries agreed to adopt a legally binding deal to limit global temperature rises to below 2°Celsius and pursue efforts to limit it to 1.5° Celsius.

In May 2019, the Independent Committee on Climate Change in the UK recommended that the UK should improve its target from an 80% reduction in global warming gases to net zero emissions by 2050. The Government has pledged to do just that.

In March 2021 Sir James Bevan, Chief Executive of the Environment Agency (EA), gave a speech in which he said there are two numbers you need to know about climate change: 51 billion and zero. The former is the number of tons of greenhouse gases typically added to the atmosphere each year due to human activities. The latter is the number of tons we need to get to by 2050 to avert a climate crisis.

With eyes on that Net Zero target, Sir James spoke about the challenge facing all businesses of getting themselves to net zero while still achieving all the outcomes our organisations exist to deliver.

Therefore, it is vital that businesses share ideas, learn from others and work in partnership to meet sustainability challenges while still delivering key business outcomes. The challenge of getting to net zero is already driving a huge amount of innovation, growth, efficiency, and the right kind of disruption.

# The Construction and Building Industry

**This all presents the UK building industry with both a massive challenge and a huge opportunity. The industry directly accounts for 10% of the country's emissions and influences 47% of all emissions through its work.**

According to the EU's **Energy Performance of Buildings Directive**, buildings are responsible for approximately 40% of EU energy consumption and 36% of the greenhouse gas emissions. Buildings are therefore the single largest energy consumer in Europe.

The UK's Climate Change Committee has identified that industrial and commercial property and infrastructure requires £5-10 billion a year to reduce carbon emissions. These are huge sums but it's not simply a matter of throwing enough money at the problem. The solutions will require innovation, collaboration, ambition and for every cog in the wheel to play its part.

It is important to remember that reaching net zero carbon by 2050 means we must understand and tackle embodied carbon as well as operational emissions. The UK Green Building Council defines embodied carbon as: '...the total greenhouse gas emissions (often simplified to "carbon") generated to produce a built asset. This includes emissions caused by extraction, manufacture/processing, transportation and assembly of every product and element in an asset. In some cases, (depending on the boundary of an assessment), it may also include the maintenance, replacement, deconstruction, disposal and end-of-life aspects of the materials and systems that make up the asset.'

Main contractors will increasingly find that clients and frameworks will ask more and more of them to reduce embodied carbon and operational carbon use; therefore manufacturers in the sectors which supply them - such as rooflights - will be asked to contribute. This is where the opportunity lies. Rooflights are a largely under-utilised resource.

# Taking Action

The UK's Climate Change Committee (CCC), an independent statutory body, says the UK can end its contribution to global warming within 30 years by setting an ambitious new target to reduce its greenhouse gas emissions to zero by 2050. Scotland has even greater potential to remove pollution from its economy than the UK overall, and can credibly adopt a more ambitious target of reaching net zero greenhouse gas emissions by 2045. Wales, says the CCC, has slightly lower opportunities than the UK as a whole, and should adopt a target of a 95% reduction in greenhouse gas emissions by 2050 compared to 1990 levels.

The CCC believes the foundations are in place throughout the UK and the policies required to deliver key pillars of a net zero economy are already active or in development, as long as the Government sets the direction and provides the urgency.

The UK Green Building Council's report, **Net Zero Carbon Buildings: A Framework Definition**, sets out a framework intended as a first step towards delivering buildings that are in line with the aims of the Paris Agreement.

The World Green Building Council is catalysing the construction and property industry to lead the transition to a net zero carbon built environment, through its Advancing Net Zero campaign, which the UK Green Building Council (UKGBC) has embraced and adopted for a UK context.

The UKGBC report aims to advance historical zero carbon policies that only focused on operational energy and modelled performance in new buildings; the report expands the scope to in-use performance and the whole-life carbon impacts of both new and existing homes and buildings. The report outlines an overarching framework of consistent principles and metrics that can be integrated into policy, but primarily can be used as a tool for businesses to drive the transition to a net zero carbon built environment.

The framework sets out a challenge for the construction and property industry to reimagine the way buildings are designed, constructed, and operated. It says the emphasis will increasingly be placed on a building that works as it is supposed to, with the whole construction value chain taking greater ownership and responsibility for ensuring outcomes: i.e., a focus on performance rather than compliance.

BSRIA's (Building Services Research and Information Association) report **Net Zero for Existing Buildings - Fabric First Investigation** notes that about 19% of the UK's emissions come from heating buildings - so it is vital to find ways of cutting emissions from heating.

Adopting renewable energy technologies and moving away from the use of fossil fuels seems an obvious solution. While low carbon technologies already in the market have huge potential, they are often challenging to implement in older buildings with lower levels of insulation. Therefore, retrofitting/refurbishing existing buildings to make them more energy efficient is critical. For refurbishment/retrofit projects, there is a strong argument that efforts should be first focused on improving the fabric of buildings to reduce energy demand, then adding renewable generation to meet energy needs.

A useful adjunct to these various reports, projects and plans is the **RIBA Sustainable Outcomes Guide**, which defines a concise measurable set of eight sustainable outcomes that correspond to key UN Sustainable Development Goals and can be delivered on building projects of all scales.

The guide explains each sustainable outcome and their key metrics while providing design principles to achieve the outcome; it describes approaches that can be used to verify performance using post-occupancy evaluation and certification.

An outcomes-based design approach, says RIBA, will help resolve the now well-known gaps between design intent and in-use performance across a range of metrics by reinforcing the feedback loop between briefing and outcomes, leading to a more sustainable built environment.

Other useful publications include the **Construction Leadership Council Industry Recovery Plan: Roadmap to Recovery & Buildings Mission 2030** and **The CIOB (Chartered Institute of Building) Carbon Action 2050 toolkit**.

Another vital player is the **Supply Chain Sustainability School (SCSS)**. Backed by the UK's top construction contractors and clients, the online platform helps companies to meet the challenging sustainability targets set out by the UK Construction Strategy 2025. It provides free, practical support in the form of CPD-accredited e-learning modules and training workshops, tailored assessments and action plans, benchmarking tools, networking opportunities and access to thousands of online resources. Hambleside Danelaw is one of many member companies who use the SCSS's training to develop their policies and procedures around making their own company's operations as sustainable as possible. There is not only huge breadth and quality to the training, but the training is for colleagues at all levels, which helps ensure that a commitment to sustainability is a thread that runs inclusively throughout a company.

# Government and Regulatory Input

The UK Government announced a plan in November 2020 to mobilise £12 billion of government investment to create and support up to 250,000 highly skilled green jobs in the UK, and spur over three times as much private sector investment by 2030. One of the ten areas specified in this blueprint is 'Homes and public buildings', with an ambition to make homes, schools and hospitals greener, warmer and more energy efficient, whilst creating 50,000 jobs by 2030, and with a target to install 600,000 heat pumps every year by 2028. The Government also committed to spending £1 billion this year to make new and existing homes and public buildings more efficient and to extend the Green Homes Grant voucher scheme by a year.

Suppliers to the construction sector, such as those in the roofing segment, may also be interested in the £1 billion energy innovation fund aimed at developing the technologies needed to reach new energy targets.

A significant document in the enhancement of energy performance has been **The Energy Performance of Buildings Directive 2010/31/EU (EPBD) and the Energy Efficiency Directive 2012/27/EU**. Together, the directives promote policies that help

- Achieve a highly energy efficient and decarbonised building stock by 2050
- Create a stable environment for investment decisions
- Enable consumers and businesses to make more informed choices to save energy and money.

Following the introduction of energy performance rules in national building codes, buildings today consume only half as much as typical buildings from the 1980s.

The EPBD covers a broad range of policies and supportive measures that help national EU governments boost the energy performance of buildings and improve the existing building stock.

The most significant piece of UK Regulation relating to sustainability and roofing is **The Building Regulations 2013 Approved Document Part L**, which is designed to save energy and power consumption in buildings. These Regulations are due to be updated following a recent consultation, which also proposed an ambition for non-domestic buildings called **The Future Buildings Standard**, to be implemented from 2025.

The consultation document explained that the Government's preferred option to uplift energy efficiency standards for new non-domestic buildings in 2021 is intended to deliver a 27% reduction in carbon emissions on average per building compared to the existing Part L standard.

As well as improving the energy efficiency of new buildings in the short term, the interim uplift will ensure that construction professionals and supply chains are working to higher specifications in readiness for the proposed introduction of the Future Buildings Standard from 2025.

There are many more proposals of direct relevance to the sector and which, if they become law, will have a direct impact on products and practice.

*NB This consultation relates to Building Regulations for England only.*

The London Plan, updated in March 2021, is also a significant document regarding sustainability, both directly for construction in London but also indirectly as a driver of innovation that diffuses innovative practices and approaches beyond the confines of the capital. The updated Plan tackles environment issues with more urgency and specificity, while having bold ambitions such as demanding that every design should obey circular economy principles and buildings should be designed in layers to make it easier to swap out worn parts. This has obvious implications for products like rooflights.

While there has perhaps been a dearth of specific national Government guidance and regulation, many forward-thinking developers have taken it upon themselves to initiate their own schemes, aimed at achieving the carbon reduction targets well before the 2050 deadline.

This is being done by maximising the sustainable use of resources, being bold in the use of the latest innovations on sustainability and taking a strict fabric-first approach alongside choosing innovative energy solutions. Increasingly, developers are seeking a like-minded supply chain to share their sustainable vision.

# The Role of Rooflights | 1

**It is easy to see how industry will keep driving change and how the regulatory environment will keep getting tougher - and also how invaluable it will be to clients, architects, designers, and specifiers for companies in the supply chain to keep developing innovative products, along with accompanying clear, reliable technical information.**

Among many valuable accompanying documents issued by the National Association of Rooflight Manufacturers (NARM) is **NARM Technical Document NTD06.2 - Designing with Rooflights Supporting Part L Building Regulation guidance in England; Approved Documents L1A, L1B, L2A and L2B (2013 editions).**

This document is expected to be updated as soon as the Part L guidance itself is updated - but it remains an invaluable source of information about how a well-designed building with a good spread of natural light will benefit because of passive solar gain in cooler temperatures. Passive solar gains immediately produce payback by reducing both the heating energy demand and the need for artificial lighting - which, of course, can deliver a major reduction in a building's energy consumption and CO<sub>2</sub> emissions. The document states:

*'Increased rooflight area can dramatically reduce the energy requirements of lighting systems whilst resulting in a much smaller increase in energy requirements of the heating system, but the relative effects depend on a number of other parameters for the building, such as temperature set point, hours of occupancy, and internal gains, as well as the details of the building construction. The savings in total energy costs and carbon footprint therefore vary from building to building but are usually found to be positive as rooflight area increases often up to 20% of the roof area for large buildings with internal work height greater than 6m and up to 15% rooflight area for buildings of lower than 6m work height.'*

It goes on to explain that many factors affect the contribution which rooflights can make, and hence the optimum area of rooflights will vary from building to building. It is important to also bear in mind that solar overheating is a possibility that can arise without proper consideration of the percentage of rooflights, coupled with a well-considered ventilation strategy. However, research suggests that:

- Typically, the total CO<sub>2</sub> emissions associated with all aspects of operating a building without rooflights can be over 50% higher than for a building with 12% rooflights.
- In almost all relevant buildings, savings continue to be achieved as rooflight area is increased up to and beyond 15% of floor area.
- In some buildings (typically with higher illumination requirements and used predominantly during the daytime) there are significant further savings as rooflight area increases up to 20% at higher illumination levels.

It is also worth noting, as an addendum to BSRIA's statistic that heating is responsible for 19% of UK emissions, that energy from lighting in the industrial sector is greater than that for heating energy by as much as 4:1. This demonstrates the critical benefit of natural daylighting that comes with properly designed diffused rooflights.

## Current Onsite Practice

Typically, for onsite rooflight assemblies in the industrial sector, the minimum thermal performance requirement of  $1.8\text{W/m}^2\text{K}$  to satisfy compliance with **Building Regulations: Approved Document Part L**, routinely is enhanced to a U-value of  $1.3\text{W/m}^2\text{K}$ . Generally, this is achieved by using a 10mm thick multi-wall polycarbonate sheet as the insulating layer within the assembly.

This specification has been paired with a developer-led default for a complete roof assembly that delivers a Class B non-fragility classification, with an expected service life of 25 years.

To extend the service life of these rooflight assemblies (often an Employer's Requirement), the outer sheet has traditionally been upgraded to a thicker, heavier and more resin-rich material. The insulating layer remains unchanged as a 10mm multi-wall polycarbonate sheet with the  $\text{m}^2$  weight of the rooflight liner sheet reduced, to help balance light transmission values, dependent upon the method of installation.

Typically, both constructions would contain an embodied carbon element of approximately  $46\text{kg CO}_2\text{e/m}^2$ , a figure that could be significantly improved upon by considering a low carbon material approach.

How rooflight refurbishment can impact light levels



# The Role of Rooflights | 2

**We would encourage designers to explore the Sustainable Outcomes - as defined in the RIBA Sustainable Outcomes Guide - to which rooflights can contribute. The RIBA document is itself drawn from the UN Sustainable Development Goals in Practice.**

The Guide states that rooflights can contribute to six of the Sustainable Outcomes; below we look at the four most significant:

## 1. Good Health and Wellbeing

Rooflights deliver free natural light into a building. This is recognised in regulations and by the HSE as an important benefit to workers' health and wellbeing. The NARM document 'Natural Daylight Design through Rooflighting' states that 'Providing natural daylight into the working environment is of fundamental importance for the wellbeing, efficiency and safety for the people in that environment' and 'Daylight improves concentration so that working environments, be they factories or offices with natural light, tend to achieve increased productivity'.

The amount of light required in a building will depend on what is happening in the building. The NARM document **NTD 01.2** sets out the following:

Examples of internal light levels required for various activities		
Characteristics of activity/interior	Levels of illuminance required (LUX)	Typical building/space
Continuously occupied interiors with visual tasks not requiring perception of details	200	Some warehousing and stores Reception spaces
Moderately difficult visual tasks	500	General Retail and Manufacturing areas
Difficult visual tasks requiring accurate colour judgement or perception of movement	1000	Clothing and furniture retail Sports halls
Precise detailed work requiring accurate perception or intricate detail	2000	Engineering facilities Craft & design studios (Good background lighting plus specialist task lighting)

The type and area of rooflight will have an influence on the amount of daylight that enters the building.

## 2. Net Zero Operational Carbon Emissions

Rooflights can contribute to cutting operational carbon emissions by reducing the need for artificial lighting in a building. Building management systems that include sensors with daylight harvesting will either turn off lights when they aren't needed or dim them to provide the supplementary light required to light the space to the appropriate level.

## 3. Sustainable Life Cycle Cost

The cost of a rooflight should be measured over its full life cycle from cradle to grave. Rooflights form a part of the value attached to an asset and can contribute value in a few ways:

- Reduce the need for artificial lighting. Lighting load is the single biggest SBEM (Simplified Building Energy Model) failure risk.
- Rooflights with longer service lives than industry standard will reduce lifetime costs as the replacement or upgrade is delayed
- Instead of replacing rooflights, in some circumstances they can be upgraded, eg with a new weather sheet and the addition of insulation.

## 4. Whole Life Carbon Emissions

Rooflights contribute in a number of ways:

- Durability - if materials used are stable over their lifetime and don't have issues such as high expansion/contraction and reactivity to other construction materials
- Recycling/Reuse - the ability to cut waste by reusing elements of rooflights
- Service Life - the potential to upgrade elements to extend service life
- Daylighting - exceeding CIBSE/BREEAM requirements; light transmission and the reflectivity effect; the positive heat energy benefits of solar gain
- Rooflights are essentially renewable energy sources.

Finally, it is worth noting that wall lights are also an emerging, developer-led consideration for corporate aesthetics and localised daylighting requirements.

# The Role of Hambleside Danelaw in Net Zero 2050 | 1

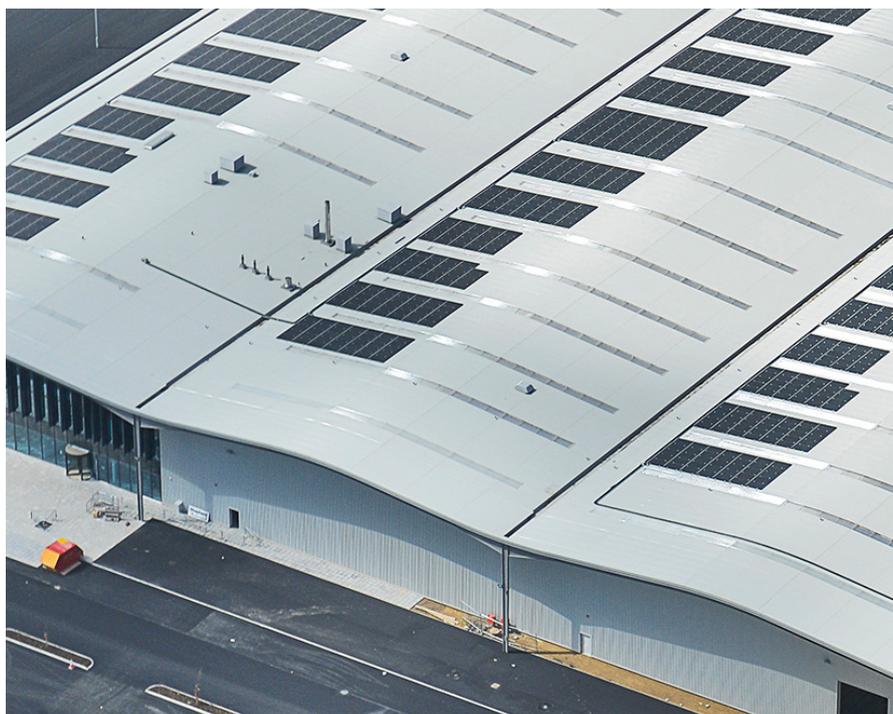
Hambleside Danelaw has been manufacturing rooflight solutions in the UK for 40 years. We have always promoted the sustainability benefits of rooflights and worked hard to deliver environmentally conscious solutions to improve building energy performance and reduce the carbon footprint through the efficient and effective use of daylight. Our Zenon® rooflight is the market leader in sustainable rooflights. We are determined to continue leading the way as the broader sector gets to grips with the paradigm shift required to hit net zero by 2050.

We have made major investments in research and product development to ensure our Zenon® rooflights perform at their optimum in delivering good levels of uniform light into buildings. Zenon® rooflights are made of GRP, which addresses the lack of light diffusion typical of polycarbonate rooflights, which can cause issues resulting from both glare and poorly-lit areas.

Light surveys have shown that, even in new buildings with roofs up to 18m or more above the floor, Zenon® rooflights achieve the all-important Daylight Factor of between 4% and 8% at floor level. This level of illumination is well above the recommendations in BREEAM (2%) and the CIBSE guidelines (3%).

Hambleside Danelaw's Zenon® GRP rooflight systems actually enhance performance compared to other rooflight systems, while also offering a market-leading contribution to the reduction of both operational and embodied carbon.

Hitachi Rail: Zenon Pro Site-assembled Triple Skin



## Case Study: 200% Improvement for Wigan Warehouse

**Refurbishment contractor NSS, working for TMT Group, specified Hambleside Danelaw Zenon® Evolution LC1 external rooflights.**

The warehouse is in two parts: the original building (Building 1), and an extension (Building 2).

Building 1 is a metal-clad warehouse. The existing rooflights were double skin GRP, with the total coverage of rooflights amounting to 10.71% of the roof area. Building 2 is also a metal clad warehouse, with existing rooflights in double skin GRP with total coverage of rooflights amounting to 8.22% of the roof area.

Before Zenon® Evolution rooflights were installed and the existing inner rooflights were cleaned, initial readings were conducted on both sections' daylight factors. Building 1 had a daylight factor of 1.32% and Building 2 was 1.37%.

After the work was completed, the natural daylight coming from the Hambleside Danelaw rooflights was such that artificial lights were not needed. Building 1 now had an average daylight factor of 3.72%, an increase of 182%.

In Building 2, the daylight factor averaged 4.12%, an increase of over 200%. The consequent savings on energy costs due to the reduced need for artificial lights will be substantial, in both carbon and financial terms.



## First with EPDs and Embodied Carbon Calculator

**Hambleside Danelaw is the first UK industrial rooflight manufacturer to have had systems assessed and independently verified by the Building Research Establishment (BRE), leading to Environmental Product Declarations (EPDs). This means that a minimum of 1.5 points can be secured for BREEAM rated projects over and above the roofing system.**

The company has also developed an Embodied Carbon Calculator, which allows for any configuration of components in the rooflight, according to the requirements of the project. This means that whatever configuration is used, the embodied carbon will always be clear and measurable.

Architects, developers, contractors, building owners and land agents can now have access to this database on a project-specific basis and use this knowledge to play their part in cutting embodied carbon.

The UK Green Building Council's report, **Net Zero Carbon Buildings: A Framework Definition**, notes that significant gaps remain in the availability of data on the embodied carbon of specific products. So, given the dearth of embodied carbon data in the manufacturing field at present, this is a valuable development.

# The Role of Hambleside Danelaw in Net Zero 2050 | 2

## Our Solutions

Hambleside Danelaw has developed two unique low carbon elements that can be used in Zenon® Rooflights, both of which provide substantial performance advantages and at the same time contribute significantly to a reduction in a building's embodied carbon.

### Insulator core

The first is the Insulator core, which is manufactured from cellulose acetate (made from recycled wood pulp), an alternative to the traditional layered polycarbonate insulating options. A 20mm thick layer of Insulator gives the same thermal performance as a 10mm layer of multi-wall polycarbonate and yet has far lower embodied carbon, as shown by data generated from the BRE.

In addition, the geometry of this core, acting as a matrix of vertical 'sun pipes', means that the percentage of light transmission through the core into the building interior is boosted by up to 30%.

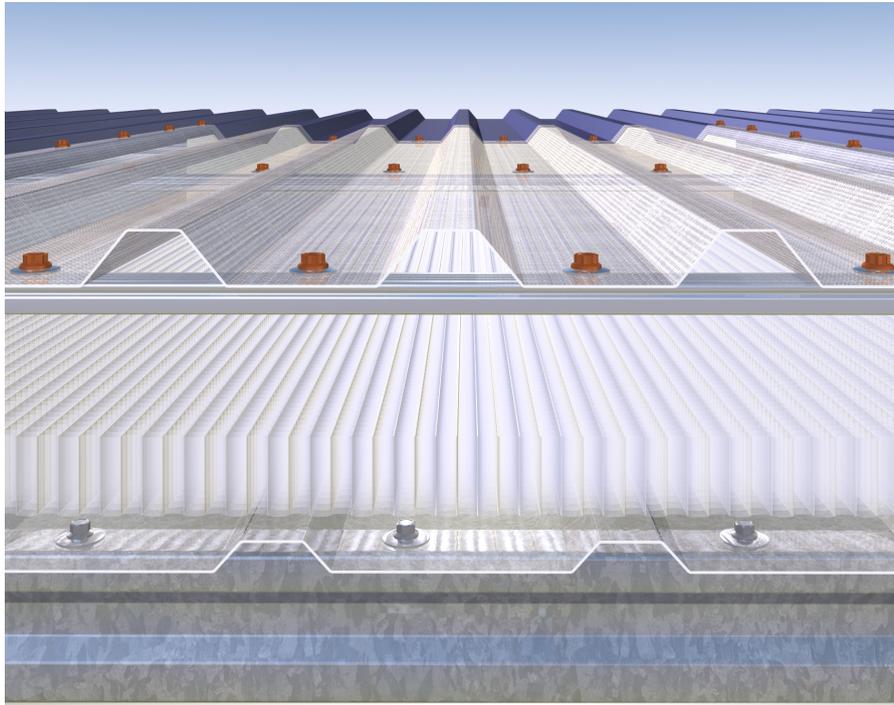
The Insulator core is also compostable after its service life has ended.

This all adds up to a very low embodied carbon figure of 0.28kg of embodied carbon per square metre compared to the comparable thermal performance of four-wall polycarbonate with 18 times the amount at 5.1kg.

### Evolution

The second innovative element that the research and development team have engineered, using state of the art reinforcement technology, is the Evolution GRP sheet which replaces the traditional glass fibre reinforcement with a woven continuous filament glass fibre fabric. This enables us to significantly reduce the resin content, meaning that the Evolution product, as a stand-alone element, has 24.17 % less embodied carbon than a more traditional product with an equivalent guarantee and service life. Distinctly advantageous, due to the reduced resin content, is the ability to manufacture a thinner product with better profile definition. This ensures an improved profile match with adjacent metal sheets.

Evolution also withstands more than twice the force needed to pass industry standard non-fragility testing, which reduces the chances it will need replacing before its full service life is complete. In addition, all Evolution rooflights are protected by Zenon® Shield, a highly durable UV protective surface film, granting the rooflight an extended service life.



Zenon Evolution

## A Low Carbon Material Approach - Fabric First Strategy

**When combining the selection of Zenon® Evolution in the rooflight assembly with Hambleside Danelaw's patented Zenon® Insulator insulation layer, the enhanced thermal performance ( $1.3W/m^2K$ ) is achieved, together with an improvement in light transmission.**

These unique material choices not only ensure that we can provide improved performance characteristics but also satisfy a non-fragility Class B, together with a service life guarantee of 30 years.

Importantly, in the context of a sustainable building, using these unique materials will lower the embodied carbon element for a typical on-site rooflight assembly by around 28% of  $kg\ CO_2e/m^2$ , provide improved service life longevity and support the ongoing reduction in the building's operational carbon emissions.

Our technical expertise is repeatedly drawn upon by developers, architects, and roofing contractors to produce project specific reports and specifications to provide superior fabric first construction solutions for GRP rooflight assemblies.

# Conclusion

**Reaching Net Zero by 2050 will only happen with the construction industry's total support and commitment. That means every contractor, every subcontractor, every developer, every architect, every member of the supply chain must commit to playing their part and to working in unison. From groundwork to rooflights, this is a whole-industry problem with a whole-industry solution.**

Each business must look at how it can contribute, including within the business itself. We must lead by example with sustainable practices and growth strategies based on providing sustainable solutions. At Hambleside Danelaw, sustainability is factored into all our business decisions. For example, we send zero waste to landfill, we generate 13% of our energy from solar panels, our new resin tank means no waste is created through IBCs, and we use rooflights in our factory, which reduces artificial light use. We can and will do even more.

Looking to the broader industry, every building specification must focus on reducing energy demand and use, reducing embodied carbon in building products, maximising the use of sustainable resources and respecting local natural habitats.

Working with clients to drive down carbon is undoubtedly a complex process that requires a huge amount of investment in innovation, skills and knowledge. We are willing to play our part.

Developers must set out to do as much as they can, scrutinising and challenging every aspect of their asset, and with total commitment to building sustainable buildings and ensuring that they are using low embodied carbon material choices when available.

Contractors and designers must be careful how new materials and processes are incorporated into a project; problems often occur at the interfaces where the consequences of new interactions are not anticipated and the performance in use is compromised by another product.

Architects must make a fabric first design approach using low embodied carbon materials as their default - indeed their only - method.

Rooflights are a comparatively small element of roof configuration, but an inclusion or upgrade that can make a significant impact to a building's sustainability. They can enhance energy efficiency, reduce operating costs, and contribute towards low carbon strategies - and make a huge difference to employees' health and wellbeing.

Particularly with regards to Local Authorities, the benefits of rooflights can never be underestimated. Whether a school, leisure centre, sports centre or even a local authority maintenance depot, rooflights can play a major role in the performance of the building - and the wellbeing and effectiveness of its occupants. That role can be played at all stages of a building's life- new build, fit-out or refurbishment/upgrade.

Hambleside Danelaw has great expertise in working with systems partners, contractors, developers and architects to deliver the perfect balance of light levels and solar gain. Different building uses have different requirements and we can adjust our rooflight specifications to be tailored to individual needs.

We believe partnerships and collaboration, not just up and down the supply chain but also between competitors, is crucial and we would like to extend an open invitation to the rooflights and broader construction sector to enter into a meaningful dialogue.

**You are very welcome to contact us in the following ways:**

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## Further Information about Zenon Low Carbon Rooflights

To download more Zenon documentation including Guides; Datasheets; Guarantees & Standards; BBA Certificates; DOP's, DOC's and EPD's please visit:

**[www.hambleside-danelaw.co.uk/downloads](http://www.hambleside-danelaw.co.uk/downloads)**

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Zenon\_Whitepaper\_October2021



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