



**SOLUTIONS FOR
SUSTAINABLE BUILDINGS**
THE GUIDE TO LEED



Architect: Arata Isozaki/RHWL architects

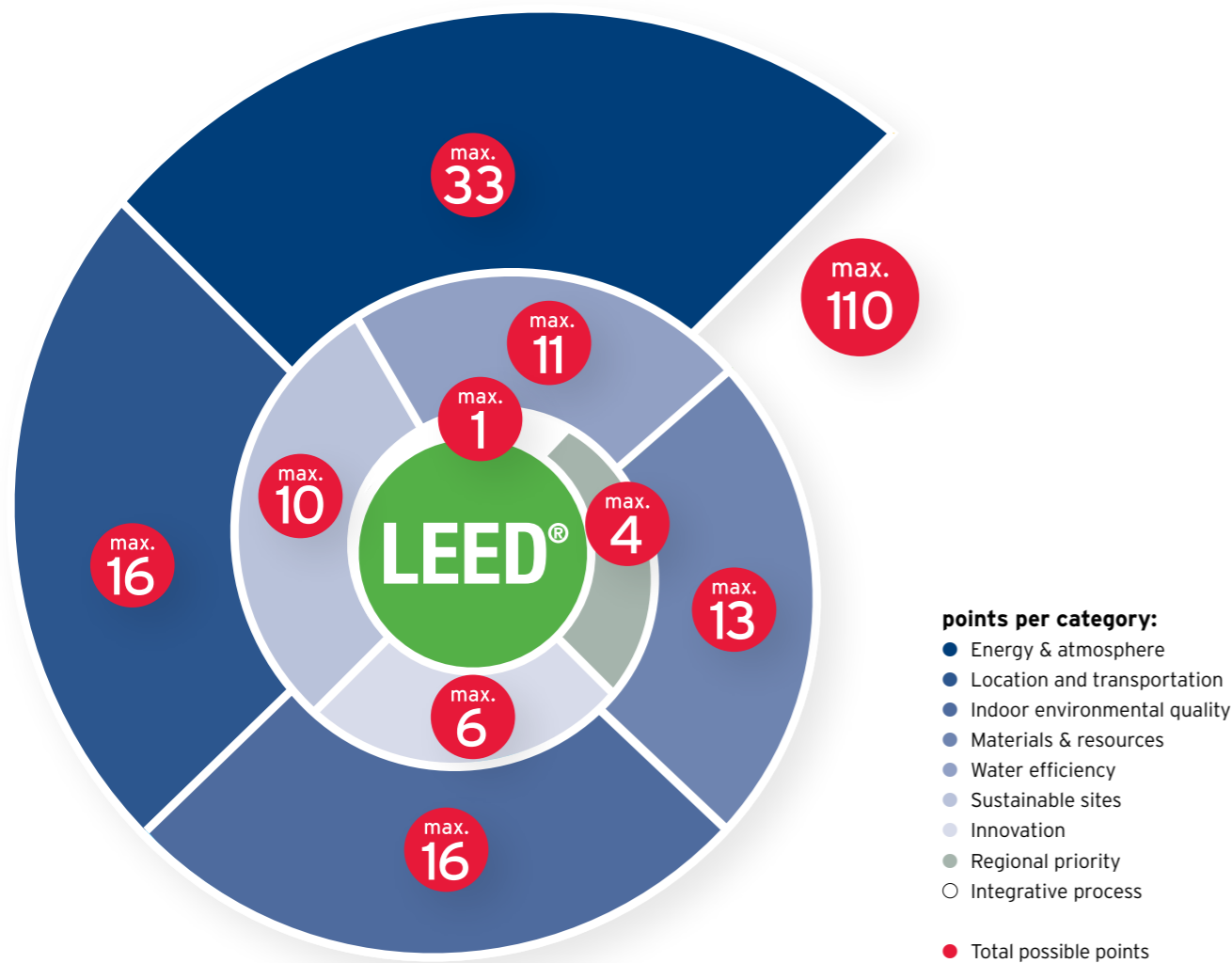
Reynaers Aluminium develops innovative and sustainable aluminium solutions

We develop aluminium solutions for windows, doors, curtain walls and sun screening, which increase the architectural value of buildings and enhance people's living and working environment. Integration of Reynaers Aluminium products in buildings can contribute to the overall sustainability level of the building, thus achieving points for building certificates such as LEED.

The **LEED** (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary, evolving, consensus-based international standard for developing high-performance, sustainable buildings, using a comprehensive, point-based system. The LEED certification programme is initiated by USGBC (US Green Building Council) and is internationally recognized.

The certification confirms that a building is designed and built to achieve a performance that surpasses national standards for energy savings, water efficiency, CO₂ emissions reduction, indoor environmental quality, stewardship of resources and environmental impacts.

These topics are specified in nine categories, with multiple credits, on which the building is evaluated. LEED points are awarded per credit on a 110-point scale, resulting in four levels of performance - Certified, Silver, Gold and Platinum.



Architect: Arata Isozaki/RHWL architects

Using Reynaers Aluminium's solutions in combination with other building components, **up to 24 LEED points can be gained** on the following credits (according to LEED v4 for New Construction and Major Renovations):



Category	Credit	Max. points	Window Door	Sliding door	Curtain wall	Sun screening
● Energy & Atmosphere	Minimum Energy Performance	Required	-	-	-	-
	Optimize Energy Performance	max 18	7	6	8	8
	Renewable Energy Production	max 3	0	0	3	3
● Indoor Environmental Quality	Minimum Indoor Air Quality Performance	Required	-	-	-	-
	Enhanced Indoor Air Quality Strategies	max 2	1	1	1	-
	Low-Emitting Materials	max 3	3	3	3	-
	Daylight	max 3	2	2	2	1
	Thermal Comfort	max 1	1	1	1	1
	Quality Views	max 1	1	1	1	-
● Materials & Resources	Building Product Disclosure and Optimization - Environmental Product Declarations	max 2	1	1	1	0
	Building Product Disclosure and Optimization - Material Ingredients	max 2	1	0	1	0
● Sustainable sites	Heat island reduction	max 2	0	0	0	1
● Innovation in design	Innovation	max 5	1	1	1	1
● Regional priority		max 4	1	1	1	1

Energy & Atmosphere

More than 40% of the energy used within the European Union is used in heating, cooling, lighting and managing the buildings in which we live and work. This figure must be reduced by at least 60% before 2050 in order to meet current global climate change targets. Reynaers Aluminium is uniquely positioned to help reduce the environmental impact of new and existing buildings. Our declared intent and philosophy is to continue innovating towards a greener planet and the objective of zero-energy building across Europe.

Prerequisite: Minimum Energy Performance

A minimum level of energy efficiency must be achieved by the building and its systems in order to reduce the environmental and economic harms of excessive energy use. This can be demonstrated by whole-building energy simulation or through compliance with the ASHRAE Advanced Energy Design Guide requirements or Advanced Buildings Core Performance Guide. This minimum energy performance level is mandatory for each project.



Optimize Energy Performance

By optimizing the Energy Performance level, incrementally from 6% to 50% for new construction or 4% to 48% for Major Renovation, up to 18 points maximum will be awarded.



Aim

- To achieve increasing levels of energy performance beyond the prerequisite standard
- To reduce environmental & economic impacts associated with excessive energy use

Parameters

- Option 1: Whole-building energy simulations (1 to 18 points)**
 - Relevant fenestration (frame and glass) properties for execution of Dynamic Building Simulation
 - U-value
 - Solar Factors
 - Defining energy performance using Dynamic Simulation Modeling
- Option 2: Prescriptive compliance path (1 to 6 points)**
 - Compliance with ASHRAE Advanced energy design guide

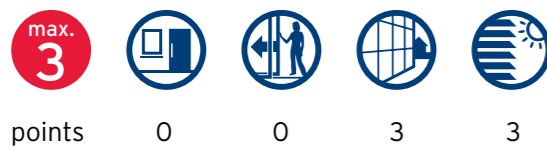
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Our window and door solutions, sliding doors and curtain walls provide exceptional insulation and create buildings with excellent energy performance. With our high-insulation range, in combination with triple glazing, your building's energy performance can be improved by up to 20% compared to the Ashrae standard. This improvement can result in 8 LEED points for new construction and 9 LEED points for major renovation.

Product range analysis		Points		Points
Windows & Doors	MasterLine	7	ES 45-Pa	6
	CS Series	6	CD Series	7
	SlimLine 38	6	TS Series	7
Sliding systems	CP 130-HI	6	Hi-Finity	6
	CP 155-HI	6	SlimPatio 68	6
Curtain wall systems	CW 50	8	CW 65-EF	8
	CW 60	8	CW 86(-EF)	8
Folding systems	CF Series	6		
Sun-screening	BS 40	7	BS 30, 100 solar	8



Renewable Energy production



Aim

- To reduce the environmental and economic harms associated with fossil fuel energy by increasing self-supply of renewable energy.

Parameters

- Produced renewable energy as percentage of building's annual energy cost

% renewable energy	Points
1%	1 point
5%	2 points
10%	3 points

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Our building integrated photovoltaic solutions for curtain wall and shading systems (CW 60 solar, BS 100 Solar, BS 30 Solar) provide excellent characteristics for this credit. Also, with our RB 10 Solar, solar panels can be integrated into the balustrade. Integrating these PV panels can reduce the energy cost of the building by 10% or more, as part of the energy consumed by the building is produced on site in the roof, façade, shading system or balustrade, contributing to the ideal of a zero-energy building. This reduction in energy costs can achieve the maximum of 3 LEED points.

All photovoltaic (PV) technologies can be used. However, the type of PV cells and the available PV area will affect the amount of energy produced.



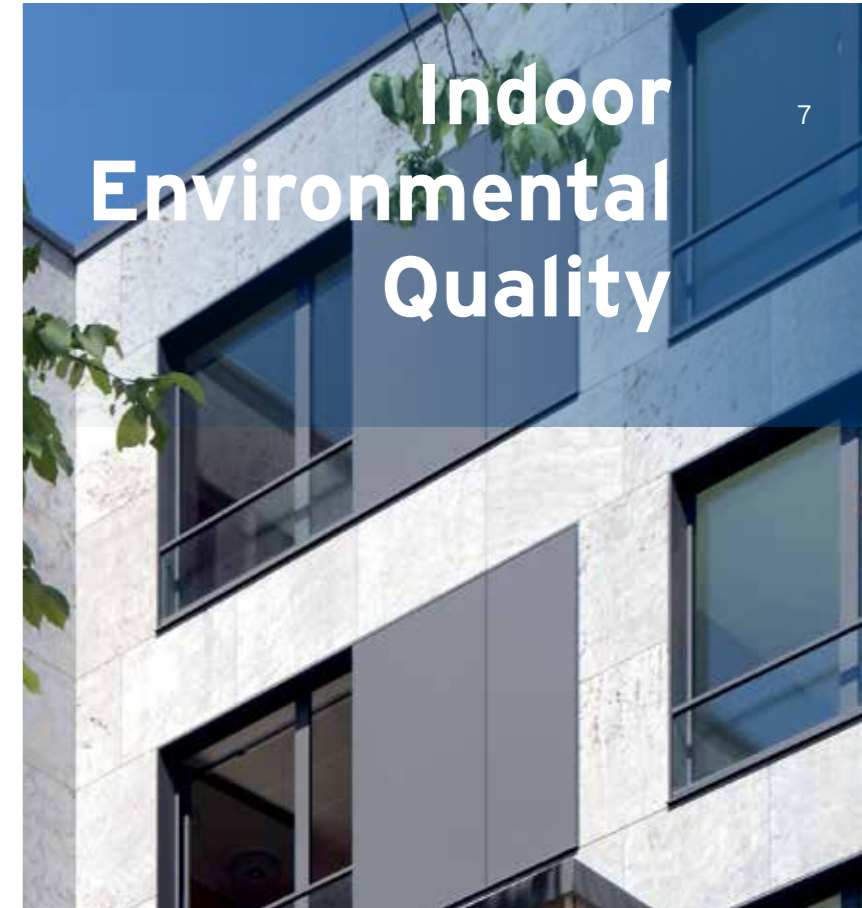
Prerequisite: Minimum indoor air quality performance

Aim

- To contribute to the comfort and well-being of building occupants by establishing minimum standards for indoor air quality.

Parameters

- Mechanically Ventilated Spaces**
 - ASHRAE 62.1 or CEN Standards EN 15251 and EN 13779
- Naturally Ventilated Spaces**
 - Minimum outdoor air opening (ASHRAE 62.1)
 - Operable windows or alternative natural ventilation strategy



Indoor Environmental Quality

Enhanced Indoor Air Quality Strategies



Aim

- To promote occupants' comfort, well-being, and productivity by improving indoor air quality

Parameters

- Mechanically Ventilated Spaces**
 - Entryway systems
 - Interior crosscontamination prevention
 - Filtration
- Naturally Ventilated Spaces**
 - Design: Chartered Institution of Building Services Engineers (CIBSE) Applications Manual AM10, March 2005, Natural Ventilation in Non-Domestic Buildings, Section 2.4
 - Entryway systems

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The best way to get fresh air into a building is by opening a window or sliding element. The turn and tilt position of a window gives the user two levels of fresh air supply. These windows can also be integrated in curtain wall systems, achieving natural ventilation in the building.

Natural ventilation is also possible through the use of MasterLine ventilation vents. These vents are limited in width to offer a breath of fresh air while ensuring full safety. With the Ventalis system, available in Eco system, CS 68, CS 77, CP 130 and CP 155, an adequate cross air flow strategy can be achieved.





Low-Emitting materials

max. 3 points 3 3 3 -

Aim

- To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

Parameters

- List all specified interior as applicable to the project's scope of work
- Collect the VOC values
- Stay under the LEED VOC Baseline

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Reynaers Aluminium products use low VOC powder coating and low VOC gaskets



Daylight

max. 3 points 2 2 2 1

Aim

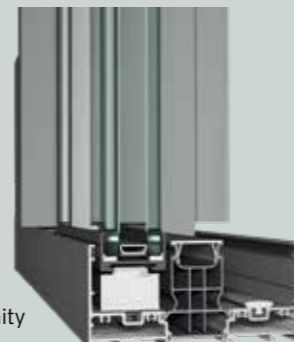
- To connect building occupants with the outdoors, reinforce circadian rhythms, and reduce the use of electrical lighting by introducing daylight into the space.

Parameters

- Sufficient daylight provision in the regularly occupied spaces of the building
- Provide manual or automatic glare-control devices for all regularly occupied spaces.
- Daylight simulation study required

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Good access to daylight is one of the major benefits of completely glazed curtain walls or roofs and sliding doors. This credit can be readily achieved by integrating these solutions into the building. The correct integration of windows can also provide building users with uniform daylight illuminance exactly where needed. Selecting the correct glazing with high light transmittance or solar control will, in the day lighting zone calculation or the light simulation study, prove that the required daylight illuminance levels can be achieved. The use of sun screening systems such as BS 100 or BS 30 will not obstruct the view and gives the perfect combination of light, view and shading.



Hi-Finity

Thermal Comfort

max. 1 point 1 1 1 1

Aim

- To promote occupants' productivity, comfort, and well-being by providing quality thermal comfort

Parameters

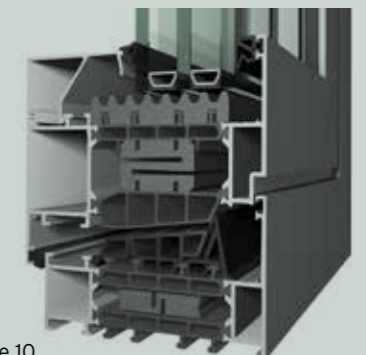
- Thermal Comfort Design: HVAC and building envelope must meet requirements of option 1 or option 2
Option 1: ASHRAE STANDARD 55-2010
Option 2: ISO 7730 and CEN EN 15251 STANDARDS
- Thermal Comfort Controls

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A comfortable temperature will greatly improve people's well-being as well as their productivity. Reynaers Aluminium solutions, in combination with suitable glazing, provide the required insulation to achieve the right level of thermal comfort. Reducing draughts and improving thermal comfort also depends on the correct installation of airtight elements. A high quality production system and the use of Reynaconnect will guarantee air tightness of the total solution.

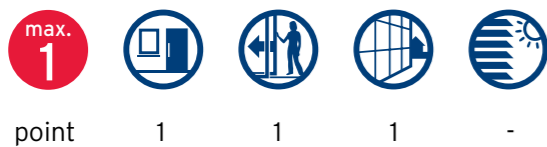
Aside of the thermal insulation aspect, an effective shading system will also greatly improve thermal comfort during summer.

To achieve these LEED points, an evaluation of the building envelope is required to guide design decisions.



MasterLine 10

Quality Views



Aim

- To give building occupants a connection to the natural outdoor environment by providing quality views.

Parameters

- Achieve a direct line of sight to the outdoors via vision glazing for 75% of all regularly occupied floor area.
- View glazing in the contributing area must provide a clear image of the exterior

Architect: CMC Architects

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A room with a view is the best commercial argument in real estate.

In general, people spend more than 90% of their time indoors and more than 30% of the time in offices in front of a computer screen. So it's no surprise that people readily appreciate a pleasant view of the world outside. Looking through a window allows them to refocus their gaze from the intensive work on a screen or other detailed work, preventing tired eyes or headaches. All Reynaers Aluminium systems provide building occupants with this external view, making it possible to achieve the appropriate LEED point. The use of sun screening systems such as BS 100 or BS 30 will not obstruct the view and gives the perfect combination of light, view and shading.



Acoustic performance



Aim

- To provide (work)spaces that promote occupants' well-being, productivity, and communications through effective acoustic design.

Parameters

- Minimize the effect on building occupants of site exterior noise produced by road traffic, aircraft, railroads, etc.
- Use acoustical finishes to reduce interior noise
- Meet local applicable codes or 2010 FGI and 2010 SV Guidelines

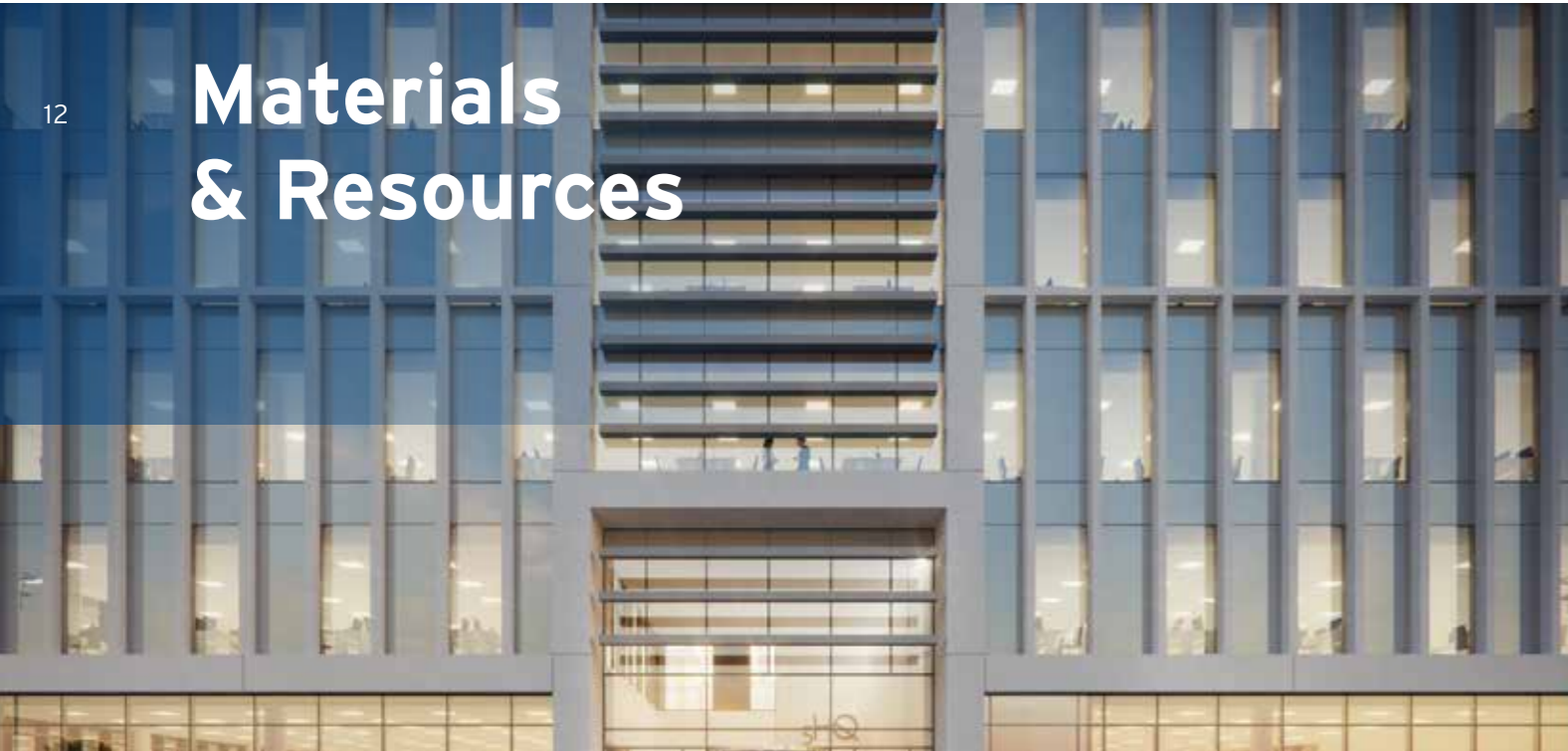
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All Reynaers Aluminium systems can achieve acoustic results (Rw) ranging from 40dB up to 60dB, depending on the system and the glass specifications. Selecting the correct glazing will further improve the acoustic insulation.

Architect: MYS Architects Studio



Materials & Resources



Sustainable sites

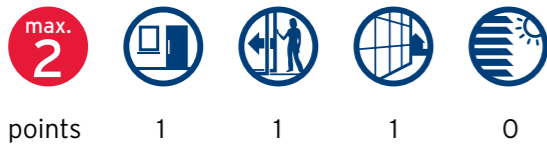


Building Product Disclosure and Optimization

Aim

- To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts.

Environmental Product Declarations



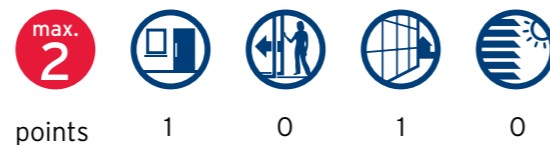
Parameters

- Option 1: Environmental Product Declarations (EPD) (1 point)**
 - Use at least 20 different permanently installed products sourced from at least 5 different manufacturers having either product-specific declarations, industry-wide EPD or product-specific type III EPD.

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EPD's are available for a wide range of solutions.

Material Ingredients



Parameters

- Option 1: Material ingredient reporting (1 point)**
 - Use at least 20 different permanently installed products for at least 5 different suppliers that use any of the approved programs (e.g. Cradle2Cradle,...) to demonstrate the chemical inventory of the product.

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C2C v3 Bronze level certificates are available for a selected range of products.

Heat Island reduction



Aim

- To minimise effects on microclimates and human and wildlife habitats by reducing heat islands.

Parameters

- Providing strategies to decrease the heat absorption of exterior nonroof materials
- Shade provision
- High Solar Reflectance Index (SRI) or solar panels
- Open-grid pavement
- Covered parking spaces
- Adequate selection of exterior materials and shade analysis required

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With our standard shading systems (BS 30 and BS 100), we can provide shaded areas with a high Solar Reflectance Index by using light colored surface finishes. Additionally, solutions with integrated solar panels, such as the BS 30 Solar, BS 100 Solar and the Solar Roof (CW 60 Solar), can be used to cover pavement or parking spaces, reducing heat absorption of these exterior surfaces while providing renewable energy at the same time.

With the application of Reynaers Aluminium solutions, as part of the global building concept, one LEED point can be achieved.



Innovation



Innovation

max. 5 points

1 1 1 1

Aim

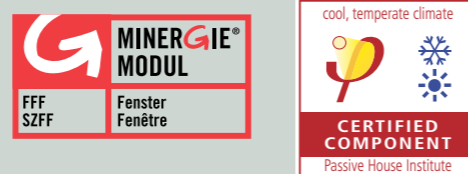
- To provide design teams the opportunity to achieve exceptional performance above the LEED requirements
- Innovative performance in Green Building categories not specifically addressed by LEED
- To contribute to the further development of the LEED system through application of pilot credits

Parameters

- Innovation application(s): PV cells integrated in glass, glare control system and balustrade (CW 60, BS 30 Solar, BS 100 Solar and RB 10 Solar)
- For each submission: assessment of USGBC required (project-by-project). Each approved innovation will gain 1 credit with a maximum of 3 credits available.

Reynaers Aluminium

Reynaers Aluminium's mission statement is to develop innovative and sustainable solutions that increase the architectural value and enhance the living and working environment of buildings. Thus we are dedicated to providing solutions with exceptional performance, offering features such as burglary and bullet protection, fire and smoke protection, earthquake proofing, PV cells in sun screening and glass, Minergie® or Passive House® product certification, etc. These specific features can help gain an extra LEED point.



Regional Priority

max. 4 points

1* 1* 1* 1*

Aim

- To provide an incentive for achievement of credits that address geographically-specific environmental priorities

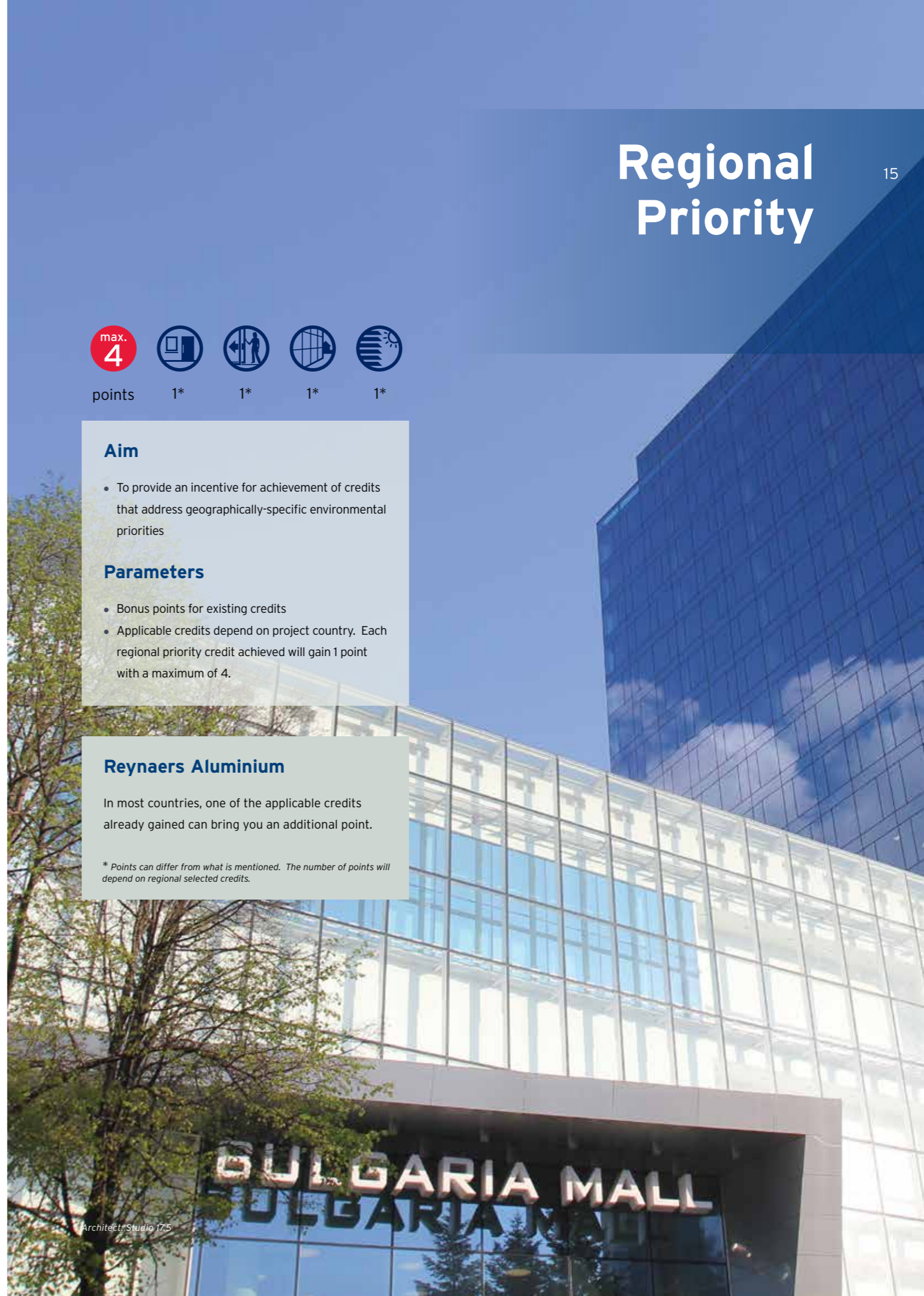
Parameters

- Bonus points for existing credits
- Applicable credits depend on project country. Each regional priority credit achieved will gain 1 point with a maximum of 4.

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In most countries, one of the applicable credits already gained can bring you an additional point.

* Points can differ from what is mentioned. The number of points will depend on regional selected credits.



REYNAERS ALUMINIUM CAN HELP YOU TO ACHIEVE LEED POINTS.

Using Reynaers' solutions, in combination with other building components, up to 24 LEED points can be achieved. The feasibility to obtain these points were analyzed and confirmed by an independent and qualified expert engineering company, ENCON, specialised in optimising energy consumption.

To help you in achieving these points, Reynaers Aluminium's specialists can assist you in selecting the most appropriate solutions for your project and provide you with the necessary documents, required for the LEED application. This will include the general documents and certificates, but also project specific information to increase your LEED score.

Some Reynaers Aluminium references with LEED certificates:

- Mall Galeria Bourgas - Bulgaria
- MK 3 office building - Germany
- Qatar National Convention Centre - Qatar
- Sofia Airport - Bulgaria
- DnB Bank administrative office - Latvia
- Tekfen Bomonti - Turkey
- Afi Business Park - Romania
- Blue building - Spain
- Coca-Cola - Spain
- City West Building C1, C2 - Czech Republic
- ČSOB headquarter - Czech Republic
- Studio Malmö - Sweden
- DnB Bank administrative office - Latvia
- Royal College of Surgeons - Ireland
- Waterside Citywest - Ireland
- Capital Dock 200- JP Morgan - Ireland
- Capital Dock 300 - Indeed - Ireland
- Hanover Quay 8 'The Reflector' - Ireland
- Hanover Quay 5 '5HQ' - Ireland
- ArtGen - Czech Republic

For more information, visit www.reynaers.com to find your local Reynaers Aluminium contact.