Architect: Cigler Marani Architects

SOLUTIONS FOR SUSTAINABLE BUILDINGS

THE GUIDE TO LEED

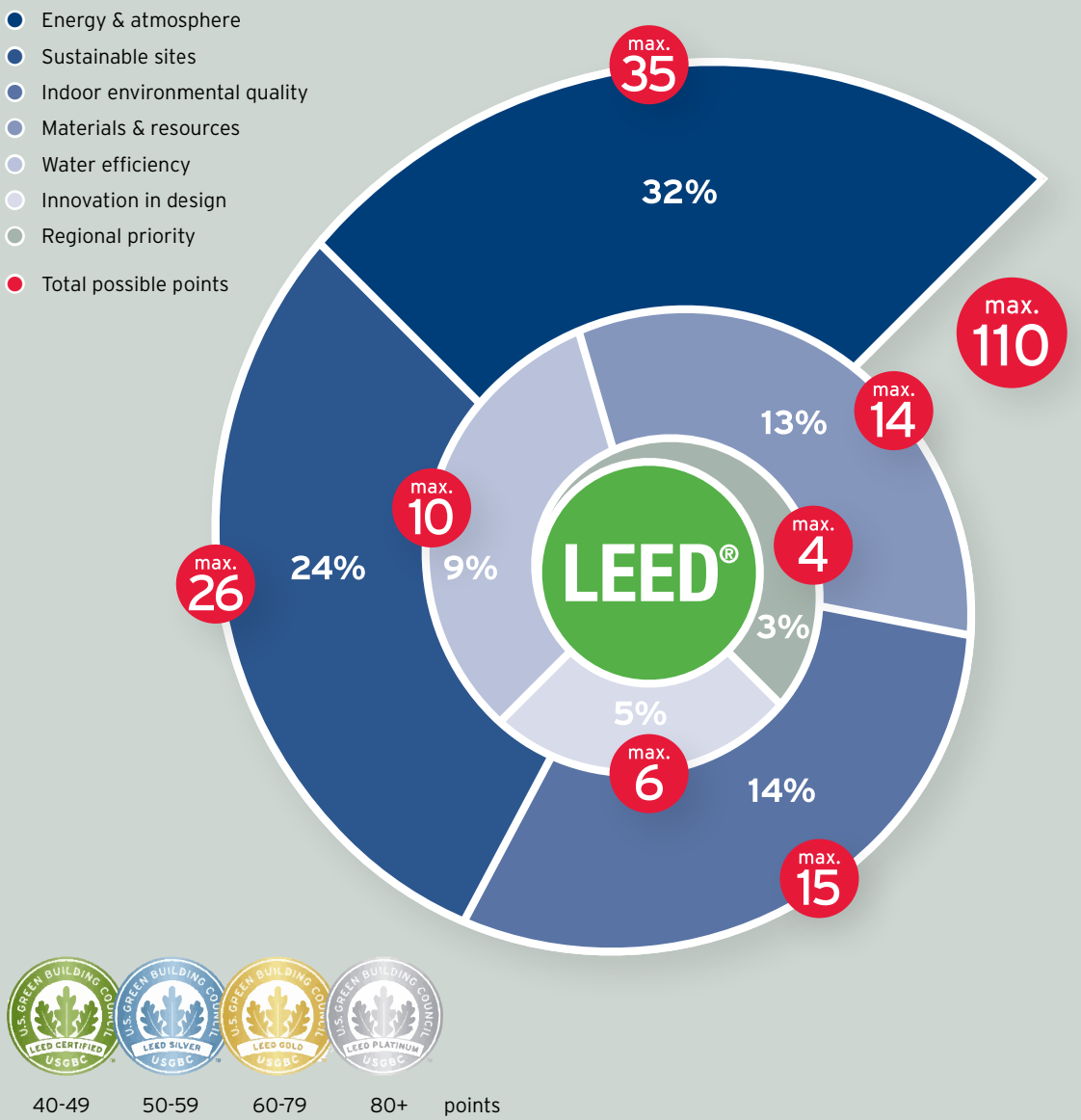
REYNAERS
aluminium

REYNAERS develops innovative and sustainable 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. By integrating these solutions in buildings, Reynaers' products 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. This LEED certification 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 sensitivity to their impacts.

These topics are specified in seven main categories, with multiple credits, on which the building is evaluated. LEED points are awarded per credit on a 100-point scale (+10 bonus points), resulting in four levels of performance - Certified, Silver, Gold and Platinum.



Using Reynaers' solutions in combination with other building components, up to 22 LEED points can be gained on the following credits (according to LEED 2009 for New Construction And Major Renovations):

Architect: Arata Isozaki/RHWL architects

Category	Credit	Max. points	Window Door	Sliding door	Curtain wall	Sun screening
Energy & Atmosphere (EA)	EAp2 – Minimum Energy Performance	Required	-	-	-	-
	EAc1 – Optimize Energy Performance	max 19	4	4	4	0
	EAc2 – On-site Renewable Energy	max 7	0	0	7	7
Sustainable sites (SS)	SSc7.1 – Heat Island Effect – Nonroof	max 1	0	0	0	1
Materials & Resources (MAT)	MRc4 – Recycled Content	max 2	2	2	2	2
	MRc5 – Regional Materials	max 2	2	2	2	2
Regional Priority (RP)	RPc1 – Regional Priority	max 4	1	1	1	0
Indoor Environmental Quality (IEQ)	IEQc6.2 – Controllability of Systems - Thermal Comfort	max 1	1	1	1	0
	IEQc7.1 – Thermal Comfort - Design	max 1	1	1	1	1
	EQc7.2 – Thermal Comfort - Verification	max 1	1	1	1	1
	IEQc8.1 – Daylight & Views - Daylight	max 1	1	1	1	0
	IEQc8.2 – Daylight & Views - Views	max 1	1	1	1	0
Innovation in Design (ID)	IDc1 – Innovation in Design	max 5	1	1	1	1

ENERGY & ATMOSPHERE (EA)

LEED

Architect: Cigler Marani Architects

EAP2 - MINIMUM ENERGY PERFORMANCE (REQUIRED)

An energy modeling study is required, aiming for at least 10% improvement compared with the baseline building performance rating. This minimum energy performance level is mandatory for each project.

EAC1 - OPTIMIZE ENERGY PERFORMANCE

By optimizing this Energy Performance level, incrementally from 12% up to over 48% improvement, up to 19 LEED points 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

Relevant fenestration (frame and glass) properties for execution of Dynamic Building Simulation

- U-value
- Solar Factor

- **Option 1 (1-19 points)**
  - Defining energy performance using Dynamic Simulation Modeling
- **Option 2 (1-3 points)**
  - Prescriptive Compliance Path

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 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 by 2020.

max. 19				
points	4	4	4	0

REYNAERS SOLUTIONS

Our window and door solutions (CS series), sliding doors (CP series) and curtain walls (CW series) 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 18% compared to the Ashrae standard. This improvement can result in four LEED points. This energy performance improvement needs to be analyzed with Dynamic Simulation modeling, as described in the parameters of this credit.

Product range analysis		EAc1 points		EAc1 points
Windows & Doors	CS 38-SL	2	CS 77	4
	ES 50	2	CS 86-HI	4
	CS 68	2	CS 104	4
Sliding systems	CP 130-HI	2	CP 155-HI	4
Curtain wall systems	CW 50	4	CW 65-EF-HI	4
	CW 60	4	CS 86(-EF)-HI	4

EAC2 - ON-SITE RENEWABLE ENERGY

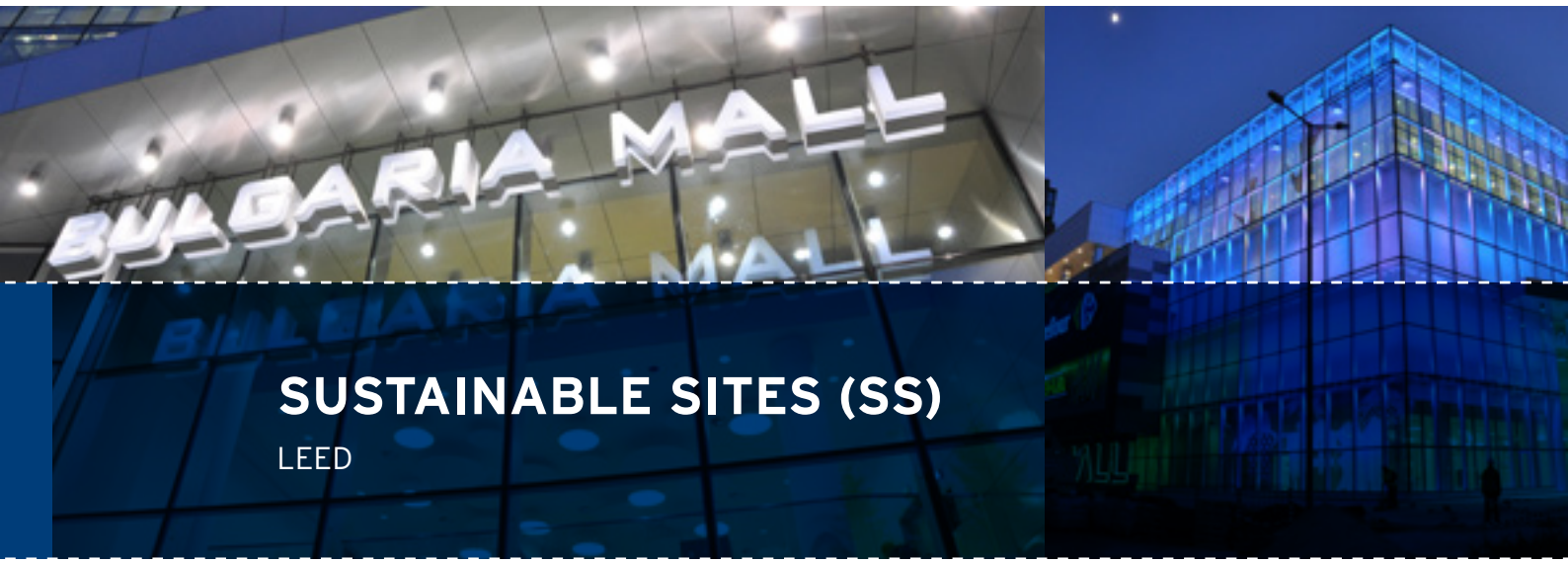
AIM

- To encourage and recognize increasing levels of on-site renewable energy self-supply
- To reduce environmental and economic impacts associated with fossil fuel energy use

PARAMETERS

- Installation of on-site renewable energy system
- Produced energy as percentage of building's annual energy cost

Renewable energy	Points
1%	1
3%	2
5%	3
7%	4
9%	5
11%	6
13%	7



SUSTAINABLE SITES (SS)

LEED

Architect: MYS Architects Studio

SSC7.1 - HEAT ISLAND EFFECT - NONROOF

AIM

To reduce heat islands to minimize impacts on microclimates and human and wildlife habitats

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

max. 7				
points	0	0	7	7

REYNAERS SOLUTIONS

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

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 up to 13%, 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 seven LEED points.

Architect: BO1 Arquitectes

max. 1				
point	0	0	0	1

REYNAERS SOLUTIONS

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 at the same time renewable energy.

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

MATERIALS & RESOURCES (MAT)

LEED

Architect: Cigler Marani Architects

MRC4 - RECYCLED CONTENT

AIM

- To increase demand for building products that incorporate recycled content materials
- To reduce impacts resulting from extraction and processing of virgin materials

PARAMETERS

- Use materials with recycled content
- Assessment only for permanently installed materials and furniture
- Material manufacturing study required

Recycled content pre & post consumer (% by weight)

- Pre = diverted from waste during manufacturing process (e.g. aluminum scrap)
- Post = waste after use by consumer (e.g. old windows)

Recycled content value = (½ x recycled content pre consumer x material cost) + (recycled content post consumer x material cost)

MRC5 - REGIONAL MATERIALS 500 MILE CREDIT

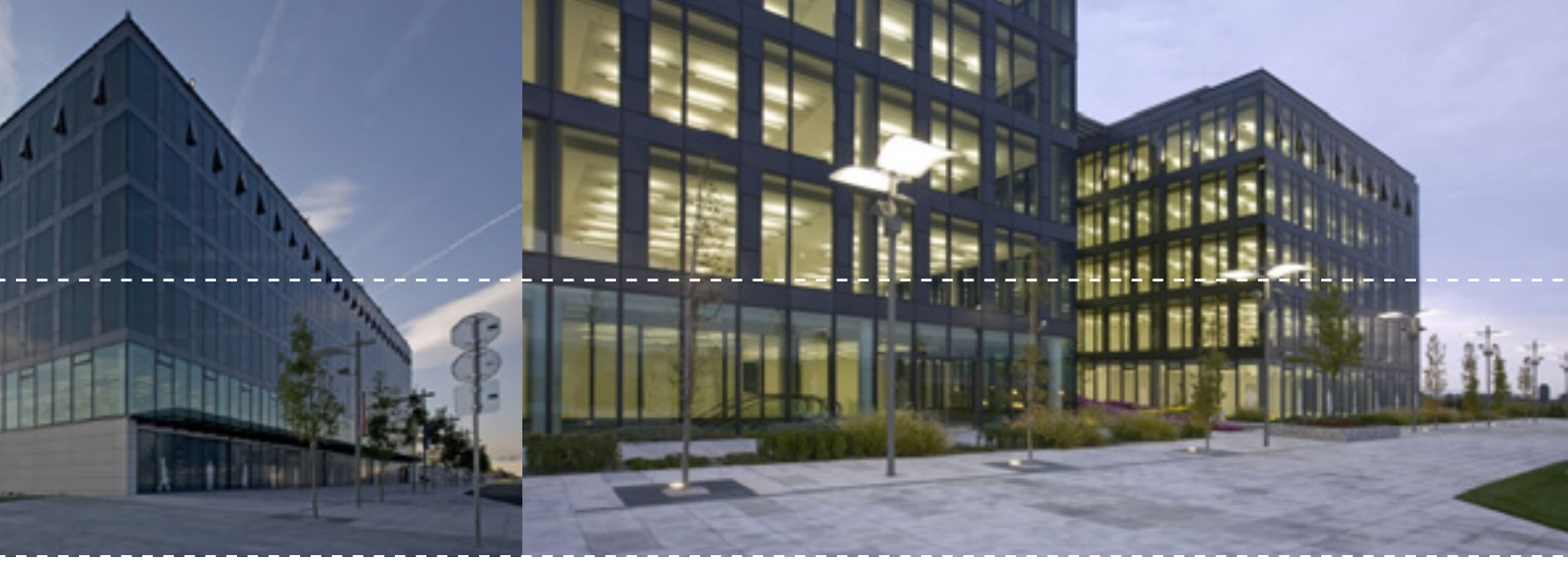
AIM

- To increase demand for building materials & products that are extracted and manufactured within the region
- Supporting the use of indigenous (= local) resources & reducing the environmental impacts from transportation

PARAMETERS

- Assessment only for permanently installed materials & furniture
- Using materials extracted, harvested or recovered & manufactured in the region (<500 miles / 804 km)
- Materials flow study required

10% regional materials = 1 LEED point
20% regional materials = 2 LEED points



max. 2				
points	2	2	2	2

REYNAERS SOLUTIONS

Aluminium is known as the green metal, as it is 100% recyclable without loss of quality and characteristics. It is a strong and light construction material with very low maintenance and long durability. Over 75% of the aluminium ever produced is still in use.

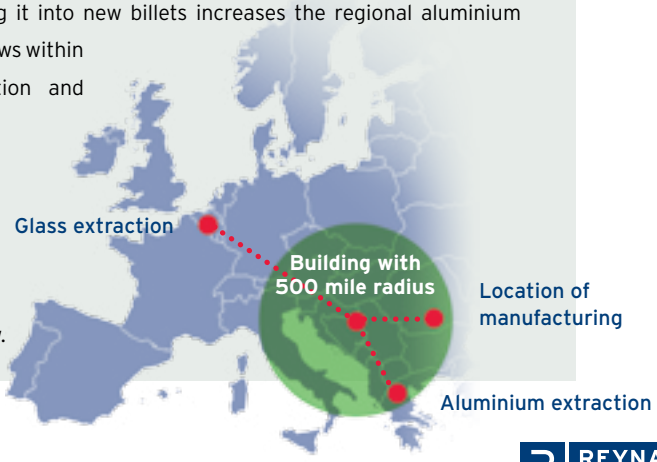
Reynaers Aluminium constantly investigates innovative ways to improve the recyclability of its products, but also involves all of its stakeholders to guarantee that aluminium windows are recycled into new windows. Each year, our supplier extruders are evaluated for the level of recycled aluminium content they deliver to us and we produce an overview of our average recycled content.

We aim for an average of 40% recycled content in our aluminium profiles (30% PRE and 10% POST consumer). We challenge our extruders to upgrade their recycled content, but they are also limited by the availability of aluminium scrap. Aluminium profiles make up only a minor part of the total of all building materials in a project, but can contribute to gaining points on this LEED credit.

max. 2				
points	2	2	2	2

REYNAERS SOLUTIONS

Aluminium billets are produced across the world, although in only a few locations. However, the recovery of aluminium can be organised locally and recycling it into new billets increases the regional aluminium value. Most of our clients will manufacture their windows within 500 miles of the project, reducing transportation and contributing to the 500-mile credit.



Example of project material flow.

REGIONAL PRIORITY (RP)

LEED

Architect: RKW Architektur + Städtebau/Hemprich Tophof Architekten

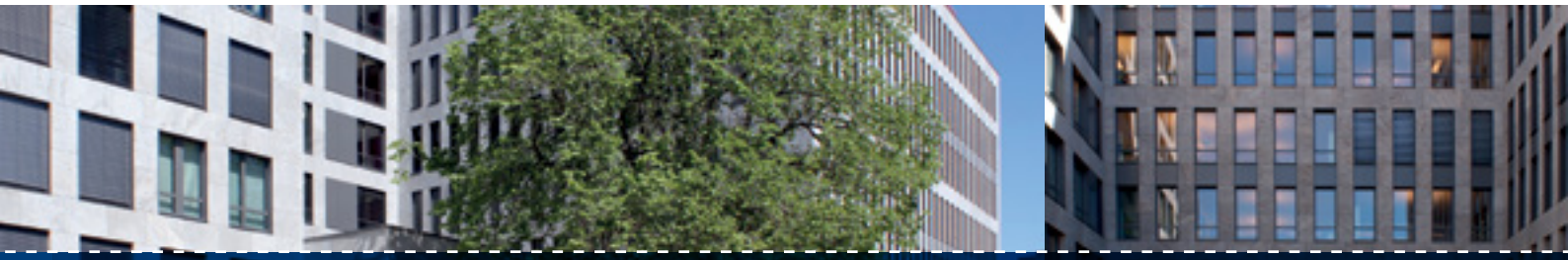
REGIONAL PRIORITY (RP)

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



INDOOR ENVIRONMENTAL QUALITY (IEQ)

LEED

IEQC6.2 - CONTROLLABILITY OF SYSTEMS THERMAL COMFORT

AIM

- To provide a high level of thermal comfort system control by individual occupants or groups in multi-occupant spaces
- To promote their productivity, comfort & well-being

PARAMETERS

- Using thermal comfort controls in the building
- OR using operable windows (instead of controls) for occupants located close to a window
- Analysis of thermal comfort parameters in accordance with ASHRAE Standard required

max. 4				
points	1	1	1	0

REYNAERS SOLUTIONS

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

max. 1				
point	1	1	1	0

REYNAERS SOLUTIONS

The best way to get natural fresh air into a building is by opening a window or sliding element (CS and CP series). 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 (CW series), achieving natural ventilation in the building.

Based on the ventilation study, the total natural ventilation needs to be set-up correctly in order to gain the LEED point.

IEQC7.1/7.2 - THERMAL COMFORT

DESIGN

AIM

To provide a comfortable thermal environment that promotes occupant productivity and well-being

PARAMETERS

- Optimal design of Heating, Ventilation, Air Conditioning & building envelope
- Analysis of thermal comfort parameters in accordance with ASHRAE Standard required

VERIFICATION

AIM

To provide for the assessment of building occupant thermal comfort over time

PARAMETERS

- Additional point to IEQc7.1
- Installation of permanent monitoring system to analyse comfort parameters
- Thermal comfort survey for occupants
- Corrective actions if necessary

Architect: MYS Architects Studio

IEQC8.1 - DAYLIGHT & VIEWS - DAYLIGHT

AIM

To provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight into the building

PARAMETERS

- Sufficient daylight provision in the regularly occupied spaces of the building
- Daylight simulation study, calculations or measurements required

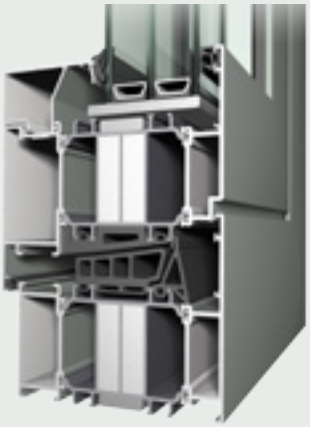
max. 2				
points	1 + 1	1 + 1	1 + 1	1 + 1

REYNAERS SOLUTIONS

A comfortable temperature will greatly improve people's feelings of well-being as well as their productivity. Reynaers 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 therefore guarantee air tightness of the total solution.

As well as 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. Alternatively, the thermal dynamic analyses for EAc1 can be used. An additional point can be obtained after verification of the building in use.



CS 104

max. 1				
point	1	1	1	0

REYNAERS SOLUTIONS

Good access to daylight is one of the major benefits of completely glazed curtain walls or roofs (CW series) and sliding doors (CP series). This credit can therefore 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, resulting in the LEED point for this credit.

IEQC8.2 - DAYLIGHT & VIEWS - VIEWS

AIM

To provide occupants a connection to the outdoors through the introduction of views into the building

PARAMETERS

- Direct line of sight to outdoor environment in the regularly occupied spaces of the building

INNOVATION IN DESIGN (ID)

LEED

Architect: A. Ambraso Projektavimo Firma

IDC1 - INNOVATION IN DESIGN (ID)

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

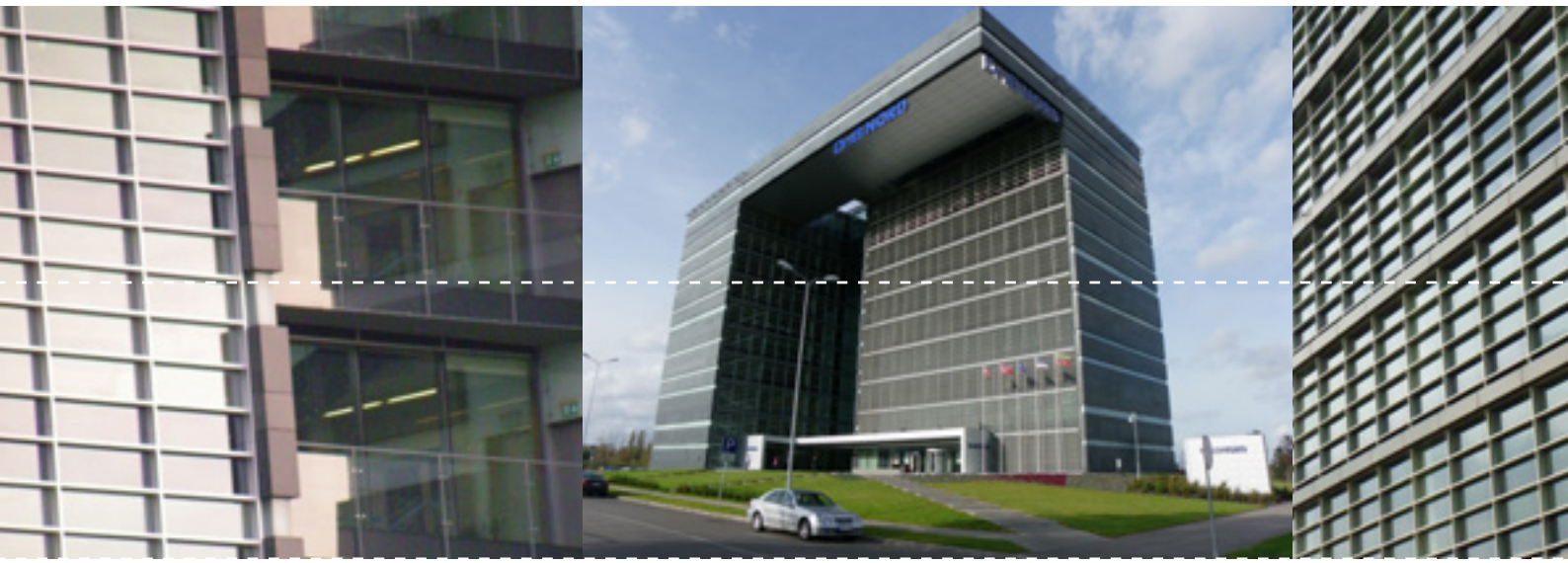
PARAMETERS

- For each submission: assessment of USGBC required

max. 1				
point	1	1	1	0

REYNAERS SOLUTIONS

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 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.



max. 5				
points	1	1	1	1

REYNAERS SOLUTIONS

Reynaers' 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.

REYNAERS CAN HELP YOU TO ACHIEVE LEED POINTS.

Using Reynaers' solutions, in combination with other building components, up to 22 LEED points can be achieved. The feasibility to obtain these points were analyzed and confirmed by an independent and qualified expert engineering company, ENCON, specialized in optimizing energy consumption.

To assist you in achieving these points, Reynaers' specialists can help you to select 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, all to increase your LEED score.

Reynaers references with LEED certificates include:

- 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

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

ABOUT REYNAERS ALUMINIUM

Reynaers Aluminium is a leading European specialist in the development and marketing of innovative and sustainable aluminium solutions for windows, doors, curtain walling, sliding systems, sun screening and conservatories. Besides offering an extensive range of standard solutions, the company also develops solutions that are tailored to the individual customer or project. Research, product development and testing are conducted at the Reynaers Institute, the sector's largest private innovation and testing centre, located in Duffel (Belgium). In addition, the company also provides extensive technical support and advice to fabricators, contractors and architects.

REYNAERS
aluminium

TOGETHER FOR BETTER

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