Green Building Certification
Since the foundation of the company more than 60 years ago, Zumtobel has been striving to create the best light for people and the environment. The company’s success is based on sustainable lighting solutions that perfectly harmonise efficiency and optimum lighting quality.
In a world of change, sustainable building is an active contribution to saving resources and ensuring a safe basis of existence for the generations to come. The significantly growing number of environmentally certified buildings shows that Green Building is a trend that will leave its mark on the international construction sector in the future.

In 2012, 44% of all commercial and institutional buildings were already built in a sustainable way. Recent studies indicate that this share will have increased to 55% by 2016. An increase is also expected for the refurbishment of buildings. In surveys, 50% of the companies questioned reported that they had sustainable refurbishment projects in the pipeline.

Green buildings provide the following benefits, among others:

- Increasing demand on the part of tenants and readiness to pay higher rents (up to 3% per LEED® certification level)
- The selling price that can be achieved is up to 30% higher for LEED®-certified office buildings
- Operating and energy costs of LEED®-certified buildings are reduced by up to 50%
- Improved CO₂ balance of the company
- Environmental certification is an instrument of corporate communication that opens up additional attractive marketing opportunities

Environmentally certified buildings rely on intelligent room design, healthy room climate and flexible lighting solutions, among other things. Measures which, as a whole, have a positive impact on the staff’s wellbeing and hence on the company’s success, as recent studies show:

- Improved wellbeing
- Increase in performance by up to 23% thanks to perfect lighting solution
- Up to 3 fewer sick days per employee per year
Source
4) Green Buildings and Productivity, CBRE Richard Ellis and USD University of San Diego, 2009
LEED® (Leadership in Energy and Environmental Design)
LEED® is an internationally recognised certification system for sustainable building, founded by the U.S. Green Building Council in 2000. Worldwide, accredited experts evaluate buildings in terms of eco-friendliness, sustainable construction and efficient use of resources. The points are awarded according to various rating systems and categories. Under the “LEED® for New Construction and Major Renovations” rating system, points for lighting solutions may be achieved in 7 categories, for instance.

LEED® awards
Certification 40 – 49 points | Silver 50 – 59 points
Gold 60 – 79 points | Platinum 80 – 110 points
LEED® 2009 for New Construction and Major Renovations,

**Green potential of light**

LEED® certification of 40 points or more

40

34

Up to 34 points (incl. Pilot Credits) can be achieved by an intelligent lighting solution by Zumtobel
How Zumtobel can support you during the certification

<table>
<thead>
<tr>
<th>Main Credit Categories</th>
<th>SS Sustainable Sites</th>
<th>IEQ Indoor Environmental Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>SS CREDIT 8: Light pollution reduction</td>
<td>IEQ CREDIT 6.1 Controllability of systems – Lighting</td>
</tr>
<tr>
<td>Intent</td>
<td>To minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve night-time visibility through glare reduction and reduce development impact from lighting on nocturnal environments.</td>
<td>To provide a high level of lighting system control by individual occupants or groups in multi-occupant spaces (e.g. classrooms and conference areas) and promote their productivity, comfort and well-being.</td>
</tr>
<tr>
<td>Requirements</td>
<td>Interior Lighting (Option 1 or 2 requisite) OPTION 1: Light pollution reduction by use of automatic controls for lighting. OPTION 2: Light pollution reduction by use of automatic shading devices.</td>
<td>Exterior Lighting (requisite) Lighting Zone classification for project site to be specified by the planner. Calculation of exterior lighting power densities according to ANSI / ASHRAE / IESNA 90.1-2007 Section 9. Description of light trespass analyses containing manufacturer’s luminaire data sheets with lamp lumen levels and photometric data. Photometric site plan or illumination model.</td>
</tr>
<tr>
<td>Contribution by Zumtobel</td>
<td>Specifications of Zumtobel control devices. Drawings with locations and sequence of operation of Zumtobel controls. Luminaire data sheet including lamp lumen levels and photometric data (Exterior Lighting) e.g. Zumtobel PAN luminaire. Illumination model / photometric site plan as a special Zumtobel service in coordination with the designer.</td>
<td>Luminaire data sheet including lamp lumen levels and photometric data (Exterior Lighting) e.g. Zumtobel PAN luminaire.</td>
</tr>
<tr>
<td>Possible Points</td>
<td>1/26 (Credit / Category)</td>
<td>1/15 (Credit / Category)</td>
</tr>
</tbody>
</table>

Source
LEED® 2009 New Construction and Major Renovations
More information: LEED LIGHT GUIDE
www.zumtobel.com/greenbuilding
### Main Credit Categories

#### EA Energy & Atmosphere

<table>
<thead>
<tr>
<th>EA PREREQUISITE 1:</th>
<th>EA PREREQUISITE 2:</th>
<th>EA CREDIT 1:</th>
<th>EA CREDIT 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental commissioning of building energy systems</td>
<td>Minimum energy performance</td>
<td>Optimize energy performance</td>
<td>Enhanced commissioning</td>
</tr>
</tbody>
</table>

**To verify that the project’s energy-related systems are installed, calibrated and perform according to the owner’s project requirements, basis of design and construction documents. Benefits of commissioning include reduced energy use, lower operating costs, reduced contractor callbacks, better building documentation, improved occupant productivity and verification that the systems perform in accordance with the owner’s project requirements.**

**To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.**

**To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.**

**To begin the commissioning process early in the design process and execute additional activities after systems performance verification has been completed.**

A commissioning authority (CxA) for the overall project has to be named, which is responsible for overseeing the commissioning activities. The owner’s project requirements have to be documented and the CxA must review these documents. A commissioning plan has to be developed and implemented. The installation and performance of the systems must be verified. A commissioning summary report has to be completed.

**OPTION 1:** Whole Building Energy Simulation. Demonstrate a 10% improvement in the proposed building performance rating compared to a baseline building according to Appendix G ASHRAE 90.1. For existing buildings, 5% are sufficient. **OPTIONS 2 and 3:** In Options 2 and 3, the building has to comply with prescriptive measures in specific design guides. These options are very rarely used in Europe.

**All Options:** The methods to prove compliance are identical to the EAP2 (Prerequisite). The percentage of energy cost saved in comparison to the baseline building must be demonstrated. The saving is calculated for the complete building, not only for lighting. The number of points depends on the percentage of energy cost saved in comparison to the baseline building. For a 20% saving 5 points are awarded, for a 48% saving even 19 points. For details please refer to the LEED reference guide.

Documentation and verification of project requirements as well as installation and performance of the lighting systems are documented in collaboration with a Zumtobel Project Manager and verification can be provided via the Light Performance Platform.

The engineer doing the simulation will require a schedule with the installed load per room or room type together with information regarding controls. Simulations are carried out using simulation software approved by LEED. Daylight-based management and presence detection can be calculated by the simulation software directly. For all other saving potentials via controls a narrative will be required but it can not be guaranteed that arguments regarding additional saving potentials will be accepted.

Zumtobel Services offers additional extended Project Documentation as well as on-site training for facility managers and users if required. In addition, maintenance agreements are offered to ensure the systems’ correct functioning.

| 0 (Prerequisite) | 0 (Prerequisite) | up to 19/35 (Credit / Category) | 2/35 (Credit / Category) |
### Bonus Credit Categories

<table>
<thead>
<tr>
<th>Credit</th>
<th>ID CREDIT 1: Innovation in design</th>
<th>ID CREDIT 2: LEED accredited professional</th>
<th>RP CREDIT 1: Regional Priority – Specific title</th>
</tr>
</thead>
</table>

#### Intent
- **To provide design teams and projects with the opportunity to achieve exceptional performance above the requirements set by the LEED Green Building Rating System and/or innovative performance in green building categories not specifically addressed by the LEED Green Building Rating System.**
- **To support and encourage the design integration required by LEED to streamline the application and certification process.**
- **To provide an incentive for the achievement of credits that address geographically specific environmental priorities.**

#### Requirements
- **PATH 1:** Innovation credits provide the opportunity to achieve credit for exceptional performance above the requirements set by LEED or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System. Pilot credits are refined through LEED project evaluations before they complete the balloting process for introduction into LEED. One point is awarded for each innovation up to a maximum of 5.
- **PATH 2:** Achieve exemplary performance in an existing prerequisite or credit that allows exemplary performance.
- **At least 1 principal participant of the project team shall be a LEED Accredited Professional (AP).**
- **Adoptions were made to the following countries: United States, Argentina, Brazil, Chile, China, Colombia, Finland, Hong Kong, Macau, Mexico, Norway, Romania, Spain, Sweden, Turkey. For countries without predefined regional priority points there will automatically be awarded one of 4 points each, if you achieve the credits in the categories WEc1, WEc2, WEc3, EAc1, EAc2 or EAc5. Select a version, system, country and zip code to view the available regional priority credits:**
  - www.usgbc.org/rpc

#### Contribution by Zumtobel
- Zumtobel products can contribute to meet the requirements for exemplary performance in EAc1 and EAc3.
- Zumtobel collaborates with LEED Accredited Professionals.
- Zumtobel has production sites among others in USA, China and Sweden.

#### Possible Points
- 1/5 (Credit / Category) | 1/1 (Credit / Category) | 4/4 (Credit / Category)
Pilot Credits

SS Sustainable Sites | IEQ Indoor Environmental Quality | MR Material & Ressources
--- | --- | ---
**Credit** | **SS PILOT CREDIT 7:** Light pollution reduction | **IEQ PILOT CREDIT 22:** Interior Lighting – Quality | **MR PILOT CREDIT 61:** Material disclosure and assessment
**Credit** | **MR PILOT CREDIT 63:** Whole building life cycle assessment

**Intent**

- To increase night sky access, improve night-time visibility, and reduce the consequences of development for wildlife and people.
- Provide comfort for occupants by establishing quality criteria for interior lighting within a space.
- 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.
- To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.
- To increase the use of products and materials with life cycles and ingredients that improve overall environmental, economic and social performance.

**Requirements**

**Option 1:** BUG Rating Method
- Don't exceed maximum luminaire uplight rating, backlight and glare ratings as defined in IESNA TM-15-11, Addendum A

**Option 2:** Calculation Method
- Don't exceed maximum percentage of total lumens emitted above horizon and vertical illuminance levels at the Lighting Boundary.

**Meet the requirements of ASHRAE 90.1 Section 9.5 or Section 9.6. They define minimum requirements for energy efficiency either for the complete building or for specific spaces.**

**Additional:**
- Achieve at least 4 out of a list of lighting quality criteria defined in the pilot credit library for at least 90% of the regularly occupied floor space. If the design is carried out according to EN 12464, most of the criteria should be achieved by default.

**OPTION 2:** Multi-attribute optimisation

- Use products that comply with one of the criteria below 50%, by cost, of the total value of permanently installed products in the project. Products will be valued as below:
  - Third-party certified products that demonstrate impact reduction below industry average in at least 3 of the following categories are valued at 100% of their cost for credit achievement calculations
  - Global warming potential [CO2e]
  - Depletion of stratospheric ozone layer [kg CFC-11]
  - Acidification of land and water sources [moles H+] or [kg SO2]
  - Eutrophication [kg nitrogen] or [kg phosphate]
  - Formation of tropospheric ozone [kg NOx] or [kg ethene]
  - Depletion of non-renewable energy resources [MJ]
  - USGBC-approved program

For further details see www.usgbc.org/node/2606895?return=/pilotcredits

**OPTION 4:** Conduct a life-cycle assessment (LCA) of the project’s structure and enclosure that demonstrates a minimum of 10% reduction, compared with a reference building, in at least 3 of the 6 impact measures listed below. (1 must be global warming potential).

- Global warming potential [CO2e]
- Depletion of the stratospheric ozone layer [kg CFC-11]
- Acidification of land and water sources [moles H+] or [kg SO2]
- Eutrophication [kg nitrogen] or [kg phosphate]
- Formation of tropospheric ozone [kg NOx] or [kg ethene]
- Depletion of non-renewable energy resources [MJ]

**Contribution by Zumtobel**

Zumtobel Datasheet

Spreadsheets comparing the installed load for each room type to the allowance of the standard. Alternatively, the full building can be compared. For details refer to ASHREA standard 90.1, which can be downloaded at: www.ashrae.org

Narrative explaining which of the criteria are fulfilled. There is no specific form to the report.

Lighting Calculations and / or luminaire Datasheets will be necessary for most criteria.

The Environmental Product Declarations from Zumtobel according to ISO 14025 and EN 15804 are based on the “Lumaires, lamps and components for luminaires” PCR. Life Cycle Assessment Practitioner is PE INTERNATIONAL.

Zumtobel can adjust the standard service life of an EPD (15 years) up to a service life of 60 years.

**Possible Points**

- 1/5 (Credit / Category)
- 1/5 (Credit / Category)
- 1/5 (Credit / Category)
- 1/5 (Credit / Category)
Life cycle assessment (LCA)

Life cycle of Zumtobel products
The Zumtobel life cycle assessment is based on the international ISO 14040/44 standard. This reliable and acknowledged tool is used to measure and rate a product’s environmental impact, from the extraction of raw materials to recycling.

The guiding principle: analysis of environmental impact during development in order to keep this impact as low as possible over the entire service life.

For further information, please refer to the sustainability report of the Zumtobel Group:
Production
- Enhancement of process quality via Lean Six Sigma
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System and environmental programmes based on this in all factories
- Roll-out of the ISO 50001 Energy Management System
- Use of product, transport and packaging as environmentally sustainable as possible
- Taking sustainability aspects into account when making investment decisions

Transport
- Documenting the CO₂ emissions produced by transport
- Taking sustainability aspects into account when selecting transport companies
- Efficient transport logistics thanks to aggregation in hub system
- Double-stacking in case of inter-company traffic

Application
- Energy-saving lighting technologies
- Efficient lighting concepts
- Minimum energy consumption by lighting thanks to integration of lighting management systems
- Less waste due to modular design

Recycling
- Participation in take-back systems for used electrical equipment
- Compliance with statutory provisions (WEEE)
Integral lighting solutions

The correct combination of luminaires and control systems achieves a wealth of benefits. Zumtobel therefore provides efficient luminaires as well as useful tools for lighting design, and a whole range of services geared towards the right, sustainable lighting solution.

- LED luminaires save up to 40% of energy costs and have a long service life
- Up to 20% of energy can be saved just by choosing an appropriate lighting concept
- A lighting management system plus dimmable luminaires and presence detectors save up to 80% of energy

Efficient use

Light sources
- Use of efficient light sources and LED technologies with high luminous flux levels and excellent lighting qualities
- Intelligent cooling systems that increase the luminaires’ life expectancy

Reflectors and lenses
- Optimum direction of light for high luminaire efficiency and high lighting quality
- Precise light distribution for efficient implementation of lighting design
- Wide range of products optimised for specific lighting applications

Control gear
- Optimum operation of lamps for high efficiency and long service life
- Intelligent functions such as Tunable White, dimmability or maintenance control are prerequisites for combining lighting quality and energy efficiency

Lighting control
- Application-oriented solutions from single rooms right up to building complexes
- Lighting control based on daylight, presence or time, as well as automatic energy saving functions
Efficient lighting solutions for your Green Building Certification

Operation
- Easy operation increases comfort and also ensures that users accept energy-saving concepts
- Support by Zumtobel’s professional staff, from design right up to commissioning and maintenance

Services
- Zumtobel service packages for regular maintenance and optimization of your system
- Support of ISO 50001 (energy management system)
For increased transparency
With our Environmental Product Declaration (EPD) for each product we make a significant contribution towards your successful certification. The EPD is a material and environmental balance based on the ISO 14025, ISO 14040/44 and EN 15804 standards (sustainability of buildings, environmental declaration for products, basic regulations for the building product category). Each document is checked and acknowledged by the German Institute Construction and Environment (IBU) e.V. In this way, we create the prerequisites for the comparability of products, for transparency with respect to the materials used and for ongoing product improvement.
Introduction and short summary

Description of product life cycle (chapter 1)

Rules for LCA calculations (chapter 2)

LCA results (chapter 3)

Independent test (chapter 4)

References
The Vodafone Village consists of three linked buildings covering an area of over 67,000 m², which now boast an all-embracing lighting solution, and stands out thanks to its energy efficiency. Vodafone's head office obtained certification according to LEED® standards (LEED® 2009 ID+C: Commercial Interiors) and qualified for Silver (52/110 possible points). The building complex is at present the largest LEED®-certified building in Italy.

- Intelligent daylight-based control makes a major contribution to saving energy (-25 %)
- At the same time, systems for reducing energy consumption inside the building allow further energy savings of up to 70 %
- Installation of CO₂ sensors ensures periodical exchange of air, thus enhancing people’s sense of well-being
The new headquarters of the traditional Lauterach-based company i+R Group is the first and only corporate building in Austria that features LEED® Platinum certification in the category “New Construction and Major Renovations, 2009”.

Zumtobel made an essential contribution to implementing the clients’ ambitious targets by providing an integrated lighting solution which scored not only in terms of efficiency, but also on account of its flexibility and user comfort.

- Largely LED-based lighting solution
- Daylight-based control and use of presence detectors
- Reduction of energy consumption for lighting by up to 70%
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