ILLUMINATED TRANSLUCENT CONCRETE FOR INTERIOR DESIGN

The Bank of Georgia’s New Headquarters

Tbilisi, Georgia
The Bank of Georgia headquarters is characterized by an amazing architecture. It has been the headquarters of the Georgian ministry for highway engineering before becoming the headquarters of the Bank of Georgia, Tbilisi, with a total area of 10,960 m². It consists of five horizontal two-storied building parts, which are arranged like stacks. Due to the raised fundament, the whole landscape and also a small stream can merge in the building.

The building was originally designed in 1975 by the architects George Tschachawa and Zurab Dschalagonia. The main concept of the design was the so-called room city: By raising the foundation, the space under the building was left for nature. Opened and lighted rooms between each part of the building - similar as in a forest - should show the light through and strengthen the physical comfort of each user.

The idea of light and nature showing through a building was the fundamental concept of redesigning the headquarters of the Bank of Georgia. Le Corbusier, Frank Lloyd Wright and Glenn Murcutt already had this idea in their minds, as well as Beijing’s Office for Metropolitan Architecture (OMA) - helmed by Rem Koolhaas – which saw its Rotterdam office carrying out the high-class project, "The Interlace" in Singapore. This idea led to the decision to renovate the building, which was listed as a national monument under preservation order since 2007.
In 2010, the board of Bank of Georgia decided to renovate the derelict building, turning it into their headquarters. The AG&P architects were charged with the entire planning and the renovation was to be finished by Spring 2011. A great and extraordinary office building was created: Incorporating nature in the whole interior design in forms of light. The architects of Architectural Group and Partner LTD (AG&P) realised a special highlight by using illuminated translucent concrete.

The ambitious and young team of architects went back to the main architectural idea to show nature and light through the building. Due to this, they installed the light transmitting concrete, produced in Germany by LUCEM GmbH in a patented industrial production process. In the concrete panels, thousands of embedded optical fibres channel the light through the translucent concrete of wall and counter claddings. Walls, walks, receptions, offices and consultation desks are shining and glowing from within. LUCEM also supplies a sophisticated mounting system with highly efficient LED panels as the light source.

Altogether, 300 square metres of LUCEM light transmitting concrete panels were used in different sections of the Bank of Georgia’s new headquarters. The extraordinary impressive walk-in cube in the tellers’ office at the ground floor lobby is lined totally with white LUCEM LINE panels. The corridors and the reception hall in the asset management department are not any less spectacular as the wall parts. The ceiling was clad with translucent concrete. LUCEM LINE injects a lightness and transparency into otherwise massive or even tight walls.

For more information, please visit www.lucem.de and www bmconsultinggroup.com.
GE Lighting’s innovative LED solution was the right brew for Korea’s popular Hollys Coffee. The new ambient lighting at 18 Hollys Coffee branches across the country was sculpted with GE’s Energy Smart LED PAR30 light. This light offers superb quality for retail environments, complete with high energy efficiency and a long life span. With the new lights, Hollys Coffee branches enjoy lower energy consumption and maintenance costs whilst enhancing its customers’ experience.
GE Lighting's innovative energy-saving LED solution is the choice for today’s leading retailers. With a focus on enhancing ambient lighting and customer experience, GE's design team retrofitted the lighting system for dozens of Hollys Coffee branches across Korea with its Energy Smart LED PAR30 lights. Hollys Coffee is a specialty coffee company headquartered in Korea and the country’s first local coffee franchise with over 340 branches in Korea, The Philippines, Malaysia and the USA.

▲ GE Lighting’s Energy Smart LED PAR30 light.

Mr. Han, Sales Manager at GE Lighting, elaborated, “The brief from Hollys Coffee called for an energy-efficient solution compared to their existing lighting system, as well as to maintain the same lighting levels while using fewer lamps. After studying the operational and experiential considerations at the individual branches, our team proposed the energy-efficient and innovative LED PAR30 lights to replace the halogen lamps. This solution also allowed for adjustment of beam angles, so that we could apply the lighting accordingly to provide optimal atmospheric experience at each Hollys Coffee branch. A total of 1,500 units of LED PAR30 lights were installed in 18 Holly Coffee branches across Korea.”

Optimal Glow for Retail Environments

GE’s 10W Energy Smart LED PAR30 light replaced the previous 75W lighting source, thereby effectively reducing energy consumption by more than 85 percent. Although the LED PAR30 lights produce fewer lumens, the lamps optics concentrate light on the target and diminishes wasted extraneous light.

Ambient lighting at Hollys Coffee branches across Korea are sculpted with GE Lighting’s Energy Smart LED PAR30 light. ▼

Ms. Kim, Manager of Hollys Coffee in Gangnam, Seoul, commented, “We are quite happy with the effects of GE’s new LED lighting solution. The majority of our customers have also given very positive feedback on the new look at our stores. The GE team fully demonstrated their understanding of our operational requirements and they bring benefit to our business.”

Reaping Returns and Reducing Environmental Impact

With GE Lighting’s new lighting solution, Hollys Coffee will enjoy estimated savings of US$12,304 per annum on an operating level, in terms of energy usage (~86.67% reduction) and maintenance (~50% fewer lamps replaced). This translates to a payback period of approximately 1.15 years. From an environmental protection perspective, the energy savings is equivalent to eliminating 236,852 lbs of carbon dioxide car emissions per year, or creating 29.4 acres of new trees.

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The Jingpo Lake in Mudanjiang
Ningan County, Heilongjiang in China
Known as the most famous mountain lake in China, the Jingpo Lake is located in the city of Mudanjiang, southwest of the Heilongjiang province. It covers an area of 1,214 square kilometres, and the approximate storage capacity of water is 16 billion cubic metres. The lake was created about 10,000 years ago when volcanic eruptions in the region blocked the flow of the Mudanjiang River.

Its attractive natural scenery and pleasant climate has made the Jingpo Lake one of the country’s scenic spots, an international eco-tourism resort, and a world-famous geological park. To further enhance the ambience surrounding the lake, a lighting scheme was added to the revamping plans, and 25 of VISIO’s BW-216-3RGBW Building Wash lights were installed around the lake. The stunning lighting scheme proved to be a hit with the onlookers and tourists and it was a perfect match for the scenery.

VISIO Building Wash BW-216-3RGBW

The VISIO Building Wash BW-216-3RGBW brings incredible light output and colour effects to any location. Delivering 430,000 lux at 1 metre and throwing colour over a distance of 80 metres, with various options of the optical lens (the narrowest beam angle -6 degrees), the BW-216-3RGBW is suitable for illuminating a variety of buildings, structures and landscapes. With a specially designed ventilation system, the BW-216-3RGBW Building Wash can run on a full-duty cycle without decreasing its brightness levels.

Born with the vision to paint the world with vivid colours, VISIO has seen many of its products installed all over the world by its partners, and thousands of end-users are enjoying their illuminated ambience, thanks to VISIO’s lighting solutions. For more information, please visit www.visio-led.com.
CLIENT: NATIONAL PARKS BOARD, SINGAPORE
MASTER PLANNER / LANDSCAPE ARCHITECT: GRANT ASSOCIATES
ARCHITECT: WILKINSON EYRE ARCHITECT
LIGHTING DESIGN: LIGHTING PLANNERS ASSOCIATES
LIGHTING SOLUTIONS:

THE COOLED CONSERVATORIES
- ERCO / CYLINDER SURFACE-MOUNTED, OPTEC, TESIS IP68
- COLOR KINETICS / LED COLOR BLAST
- GRIVEN / ACROBAT FE 250
- HK LIGHTING / AREA SPOTLIGHT
- IGUZZINI / LE PERROQUET, LINEALUCE
- MARTIN ARCHITECTURAL / EXTERIOR 200
- ROBLOX / FIBER OPTIC END CAP
- WAKO / CUSTOM-MADE COLUMN CANOPY
- WE-EF / FLC121, FLC131, FLC141, FLB141, RAIL66
- LUMENPULSE / LUMENBEAM LBX RGB

MAIN GARDENS
- ENDO / CUSTOM-MADE SPOTLIGHTS WITH VARIOUS WATTAGES (HID 20W TO 150W) AND MOUNTING OPTIONS
- WAKO / CUSTOM-MADE BOLLARD LIGHTS (5 TYPES) FOR PRIMARY PATHWAYS
- WE-EF / BOLLARD LIGHT GTY 200 FOR SECONDARY PATHWAYS

SUPERTREES
- GRIVEN / GRAPHITE 300
- MARTIN ARCHITECTURAL / CYCLO SERIES
- GRIVEN / MICRO-CLIP
- COLOR KINETICS / ICOLOR FLEX
- LED2VISION / LED DOT LIGHT

TEXT BY LIGHTING PLANNERS ASSOCIATES (WWW.LIGHTING.CO.JP)
PICTURE CREDITS: LIGHTING PLANNERS ASSOCIATES, TOSHIO KANEKO
The awe-inspiring landscape of gardens is one of the world’s trendiest ‘green’ initiatives, featuring solar-powered trees and climate-controlled flower domes. From the waterfront promenade, passers-by can get an amazing view of the Marina Bay business district skyline.
Spanning 101 hectares, Gardens by the Bay is home to more than a quarter of a million rare plants in huge domed conservatories – and in the heart of the city. Just a five-minute walk from the downtown Marina Bay area, Gardens by the Bay comprises three gardens; Bay South — the largest waterfront garden measuring 54 hectares — and Bay East, with Bay Central connecting the two.

Rapidly becoming the trademark of Gardens by the Bay are the Supertrees, which are situated at the Bay South garden. The 18 Supertrees are an amalgamation of nature, art and technology, and they come alive at night with lighting and projected media produced by Lighting Planners Associates. Through the designing of superior lighting environments, Lighting Planners Associates (LPA), a lighting design firm based in Tokyo and Singapore, strives to create comfortable yet inspiring environments of daily life.

**Lighting Concept - ‘Entertainment with Organic Lighting’**

Gardens by the Bay was seeking for a new style or twist on conventional entertainment, and lighting was one element that could potentially increase the fun and excitement of the nightscape many times over. The question was, on the entertainment value of this outdoor venue, and the difference of this venue in comparison with the exciting Marina Bay in the vicinity.

Lighting designers Lighting Planners Associates (LPA) defined the lighting design concept as Entertainment with Organic Lighting, which is, lighting that is organic and preserved as ecological, as well as, entertaining. This is an original design, which Singapore could guarantee to high global expectations.

According to LPA, it may be impractical to continue consuming inexhaustible resources, but it is absolutely necessary to become more conscious of the environment. However, there is a lookout for more thrilling forms of night entertainment and an enticing attraction for globetrotting tourists. Simply because of this, Gardens by the Bay should be a place that is stimulating, as well as, an exhilarating place to connect with nature and water. And Organic Lighting can help visitors enjoy this space in both ways.

**Key Design Considerations:**

- Creating artistic combinations of light and shadow instead of bulking up the quantity of light.
- Soothing interactive lighting to engage the wandering visitors.
- Lighting that reveals the communication power of trees, water, wind, and other natural elements.
- A place to discover the spiritual forces inside the forest.

**Light and Shadows for a Rhythmic Nightscape**

Brightness alone is not sufficient to provide a comfortable nighttime environment; it is only after well-distributed light and shadows are used to create contrast, that everyone can enjoy a rhythmical nightscape. When comfortable shadows and darkness are designed, everyone can then better appreciate the beauty of brightness. Light fixtures that are
fundamentally designed for night scenes must not interfere with the landscape during the day. Light fixtures need to be concealed and integrated within the architecture and the landscape as much as possible. The light itself should be used to emphasize the concept and uniqueness of the landscape design.

Therefore, it was critical to have an illuminance plan encompassing the entire site. Although each area has its own characteristics and style, they are all connected by common underlying concepts: principles and lighting elements, thus forming a coherent vision on the whole and creating a highly sophisticated and exciting nightscape. As LPA examined the overall lighting image of Gardens by the Bay, the guidelines for the masterplan were analyzed individually.

**The Bay South Garden: Home of the Supertrees**

Right at the Bay South garden, one can experience the futuristic-looking Supertrees, which add a surprising and surreal feel to the landscape. Designed by Grant Associates, the gigantic artificial trees measure up from 25 to 50 metres in height (equivalent to 9 to 16 storeys), with emphasis placed on the vertical display of tropical flowering climbers, epiphytes and ferns. In the day, the Supertrees' large canopies provide shade and shelter. At night, the Supertrees come alive with the lighting created by LPA.

**Lighting Concept of the Supertrees: ‘Message from the Spiritual Forces of the Forest’**

In the middle of this tropical forest, stands a grove of peculiarly tall Supertrees. The massive scale of these trees creates a canopy over the forest floor below, as they appear to be the only existence of life around. We can sense something surreal in the air, like the spirit of the forest is thriving within these trees, as if they have a will of their own and are trying to communicate a message to us. Their simple message is, we are all part of the same earth, and living organisms living together is a profound realization. They continue to stand tall, for an eternity, watching human activity and the history of life, as a silent protector of the future of this planet. Six different lighting elements have been blended and programmed to create a story using sound and light.

Photovoltaic cells and solar collectors in the Supertrees harness solar energy, which are used to operate some functions, such as the lighting.

Out of a total of 18 Supertrees, 12 are situated in the Supertree Grove, while the remaining six are placed in clusters of threes near the Arrival Square and Dragonfly Lake. All the lighting fixtures on the Supertrees are controlled through a centralized intelligent control system that makes it possible to create dynamic lighting scenes.
The vertical planting displays are effectively lit up with metal halide projectors with a 250W lamp, located around the base of each Supertree.

The coloured lighting of the membrane above the vertical planting is programmed to keep changing slowly and mysteriously, and display different colour schemes over the course of the entire night.
The Cooled Conservatories: Flower Dome and Cloud Forest

The Cooled Conservatories are another key feature, which houses temperate and tropical plants in specially created temperature and humidity conditions. These giant biomes glow with a soft light from within, due to the illumination of the flower fields and the misty mountain in the Flower Dome and Cloud Forest respectively. Soft shades of colour, with varying levels of transparency are also experienced when visitors enter the huge singular spaces. For the exterior, a soft grazing light along the ribs of the conservatory façades highlights the profile of the structures. The light is brighter towards the North side along the Marathon route, and is a gentle wash on the South side to avoid competing with the Main Garden lighting experience.

The Flower Dome

The large biome at 1.2 hectares (approximately 2.2 football fields) is 38 metres high. The glass dome is designed to suit the large field of the plants from the Mediterranean region, a variety of planting from South Africa, California and parts of Spain and Italy. At the flower field, lighting has been used to create thrilling forms of night entertainment and interactive with the wandering visitors.

The light guides onlookers to discover the exotic plants from central Chile, on the west coast of the South American Garden. The comfortable night-time environment creates a beautiful contrast and a rhythmical nightscape.

The dialogue of light and shadows emphasize on Baobabs and Bottle trees, the gigantic trees from continental Africa and Madagascar. The connection of light and natural element creates an exciting landscape when the night falls.
The Cloud Forest
The other biome – the small but taller Cloud Forest – is 0.8 hectares (approximately 1.5 football fields) and 58 metres high. The Cloud Forest replicates a cool-moist climate found in the Tropical Montane regions between 1,000 to 3,500 metres above sea level, such as Mt Kinabalu in Sabah, Malaysia, and high elevation areas in South America.

The light that reveals the power of water (35-metre-tall man-made mountain with waterfall) will delight visitors at the first glance.

From the lower walkway, the field of vision opens up to a mountain, which is planted with a mixture of fern and colourful plants. Lighting gently illuminates the fresh greenery and flowers, and the same time, creates the natural combination of light and shadows.

Further into the conservatory interiors, one will come to the dark Interpretative Media spaces, with lighting focused on the media display, which offers information about the Gardens. The interactive lighting focuses on providing a multimedia experience.

Lighting in the foreground illuminates the handrail along the walkway. The soft level of light and mist gradually washes and reveals the mountain in the distance.
Gardens by the Bay is home to more than a quarter of a million rare plants in huge domed conservatories – and in the heart of the city. Just a five-minute walk from the downtown Marina Bay area, the Gardens by the Bay comprises three gardens; Bay South—the largest waterfront garden measuring 54 hectares—and Bay East, with Bay Central connecting the two.

The botanical and architectural complex is an integral part of a sustainable strategy developed by the Singapore government in order to transform the city into a proper "Garden City," where a holistic approach and an all-encompassing eco-friendly programme further enhance the significance of greenery and flora within this country.

The Ten Horticultural Themed Gardens
Apart from the large architectural structures, the rest of the gardens at Bay East are also full of special lighting installations. A variety of lighting techniques are featured to reinforce the landscaping character of each of the ten Themed Gardens and other areas.

There is a pathway that connects the Themed Gardens to The World of Plants, where the tallest trees are planted to create a forest-like feeling. Spotlights mounted on a 10-metre pole, hidden within the trees, project light throughout the tree branches. These paths do not need fixtures or any ornate lighting effects, just simple glimpses of what might be moonlight in between overgrown thickets.

In the Fruits and Flowers garden, in-ground linear light washes the large interpretive walls that enclose the garden.

The characteristic design of the canopies created by the landscape architect is reinforced by the lighting, which is fully integrated in the canopies and other garden elements—such as benches and handrails.
Pathways are generally lit with specially designed low-height bollard lights. The design languages are derived from the landscape elements, such as the aerial root structure and characteristic graphical patterns. A curved bollard, equipped with a 4.8W LED lamp, provides lighting for the steps. The lantern with the iconic graphic is designed to project a shadow pattern onto the path.

*Gardens by the Bay* have certainly fortified the vision of its makers in creating a City in a Garden. The Gardens have intelligently captured the essence of Singapore as a tropical and green Garden City. And by coming up with more vibrant blooming schemes, *Gardens by the Bay* will definitely be a long-standing landscape of marvel and delight for many more years to come.
The London Aquatics Centre

Olympic Park, London, UK

Architects: Zaha Hadid Architects
Lighting Design: Arup Lighting (London)
Client: Olympic Delivery Authority
Picture Credits: London 2012
The flowing roof of the London 2012 Aquatics Centre posed a challenge for the venue’s lighting designers. Drawing on their experience in high-end retail buildings, they worked closely with the architect to devise a system of elliptical openings on the ceiling to accommodate lights. These meet exacting broadcast standards without creating glare for the swimmers below.

The breathtaking London 2012 Aquatics Centre is one of the permanent venues specially constructed for the 2012 Olympic and Paralympic Games. Hailed as the ‘gateway to the Games’, the Aquatics Centre hosted the swimming, synchronised swimming, and diving events. The site is positioned on the south eastern edge of the Olympic Park with direct proximities to Stratford and new pedestrian access from Stratford City Bridge crossing over it. Its design addresses the main public realm spaces implicit within the Olympic Park and Stratford City planning – primarily the east-west connection of the Stratford City Bridge and the continuation of the Olympic Park space alongside the canal.

Design Concept
The internationally acclaimed Zaha Hadid Architects won the Aquatics Centre design competition in January 2005 and published revised concept designs in November 2006, taking account of the more compact nature of the Olympic Park. Zaha’s team has been working with leading swimming pool architects S&P on installing the latest pool technology to provide maximum flexibility after the Games, and Arup on structural and services design.

The design concept of the distinctive venue is inspired by the fluid geometry of water in motion, creating spaces and a surrounding environment in sympathy with the river landscape of the Olympic Park. An undulating roof sweeps up from the ground as a wave, enclosing the pools of the Aquatics Centre with its unifying gesture.

Zaha Hadid Architects worked with the Olympic Delivery Authority, as the client, and other stakeholders, including Arup’s lighting team.

The Interior
The indoor facility has two 50-metre (160-foot) swimming pools and a 25-metre (82-foot) diving pool. The Aquatics Centre is planned on an orthogonal axis perpendicular to the Stratford City Bridge, along which the three pools are laid out. The training pool is located under the bridge whilst the competition and diving pools are within a large volumetric pool hall. The overall strategy is to frame the base of the pool hall as a podium by surrounding it and connecting it into the bridge. This podium element allowed the lighting team to contain a variety of differentiated and cellular programmatic elements into a single architectural volume, which appears to be completely assimilated with the bridge and the landscape. The podium emerges from underneath the bridge, cascading around the pool hall to the lower level of the canal side level.
With a capacity of 17,500 spectators, the Aquatics Centre’s spectacular wave-like roof is 160 metres long and up to 80 metres wide. The pool hall is expressed above the podium level by the large roof arching along the same axis as the pools, its form generated by sight lines for spectators during Olympic mode. Double-curvature geometry creates a structure of parabolic arches that provide the unique characteristics of the roof.

Illumination of the Aquatics Centre

Lighting the Aquatics Centre posed quite a challenge. Not only would the sports lighting in the main pool have to avoid glare for swimmers, it also had to meet exacting broadcast standards, and be suitable for legacy. Zaha Hadid’s flowing, wave-like design meant that — unlike a standard pool — there were no trusses to hang lights from. So instead,
lighting designers came up with an ingenious system of lighting bubbles.

Drawing on their experience in the high-end retail sector (where this solution is widely used), the team came up with the idea of using elliptical openings in the ceiling to house lights. Because the lights are recessed and not directly visible, this solution avoids excessive glare. By using more lighting fixtures, it also reduces flickering.

This approach is unusual in a building as large as the Aquatics Centre. So to make sure all stakeholders were happy, the designers created a series of visualisations to show how the design would work. They also designed special brackets for the lighting fixtures and created a 3-D model of each fitting to check for clashes.

The short programme for the work meant that contractors had to finish several lighting bubbles every week. To make sure everything went smoothly, Arup’s designers issued them with a series of drawings and kits that contained clear, straightforward instructions alongside the brackets. An unprecedented effort saw over 500 luminaires installed with very few clashes.

In the training pool, lighting fixtures take on a sculptured quality – with recessed coffers and fluorescent backlights. To ensure the building remains well lit in legacy (when the temporary stands will be removed), lighting designers analysed the patterned glass façade to ensure it reduced glare sufficiently.

Post-Olympic Plans
After the Games, most of the innovatively designed seating will be removed, leaving in legacy a 2,500 capacity swimming venue that can be boosted to 3,500 seats, and local swimming facilities.
Lighting usually represents a large proportion of the total operating budget for hotels, but cutting-edge LED lighting technology is reducing this in a sustainable way.

When hoteliers are considering how to make their hotel stand above all the rest in the area, a good lighting blueprint with green attributes may be a way to move their hotel to the top of the industry in an eco-conscious era. The industry is encouraged to introduce alternatives that are more environmentally friendly than fluorescent bulbs and halogen lamps. This not only reduces operating costs, but also demonstrates tangible environmental responsibility to hotel guests while meeting the various needs of quality lighting.

As an energy efficient light source, MEGAMAN® lamps provide different types of lighting to create the right ambience for a range of purposes. The sparkling light effect of the LED Candle series enhances lobby elegance; the accent lighting of LED AR111 and MR16 Reflectors highlights the décor, wall art and niche displays in hallways and offers bright, glare-free lighting for exercise in fitness areas; and the dimmable LED Classic series creates an intimate atmosphere in guest rooms.

All these moods can be achieved without adding weight or increasing the light-up time. Switching to LED lighting can be an easy way to save money and energy with existing fixtures. With the patented thermal design, MEGAMAN® LED lamps last up to 40,000 hours. This long-rated life can significantly reduce labour costs for changing bulbs and offers an attractive payback period. The lower heat production of LED lamps contributes to savings on air conditioning costs and helps hotels create a comfortable ambience as well.

In addition, MEGAMAN® energy efficient lamps reduce energy consumption and operation costs when compared with traditional light bulbs, as Altria Macau has discovered. Featuring contemporary and luxurious accommodation, Altria Macau has long been carrying out various environmentally friendly measures. It is a perfect example of how green lighting practices help sustainability without cheapening the overall look.

At Altria Macau, in an effort to reduce carbon, the incandescent lighting in more than 200 luxury guest rooms has been replaced with a MEGAMAN® eco-lighting solution with a smooth dimming function. This not only increases the energy saving potential of the lamps further, but also allows users greater control of their lit environment. The hotel has also installed MEGAMAN® 7W LED PAR16 Reflectors in the corridors of all guest room floors. With a beam angle of 15 degrees, the reflectors offer excellent accent lighting while using nearly 80% less power than the halogen equivalent.

The changeover of the lighting system is helping Altria Macau save around HK$200,000 in electricity costs, with energy consumption being significantly reduced when compared with the previous year and a similar occupancy rate. Not only is operating costs reduced, but also CO₂ emissions are lowered, freeing up cleaner air. This successfully creates a sustainable environment alongside luxury, which fully demonstrates the commitment of the hotel’s corporate social responsibility programme to build a green practice in the hospitality industry.
1. The Altira Macau is investing in quality eco-equipment, setting an excellent example for the industry.

2. More than 2,000 MEGAMAN® lamps have been installed in different parts of the hotel, helping the Altira Macau reduce its carbon footprint.

3. Lighting is no longer just for functionality, but also enhances comfort and luxury.

4. MEGAMAN® LED Reflectors can bring cost savings to the hotel and a comfortable, quality ambience to visitors.
AHQ East Park Mosque
Manama, Bahrain

LIGHTING DESIGN: dpa lighting consultants fz llc - BARRY HANNAFORD (PARTNER/DIRECTOR), LOUISE SANTIAGO (DESIGNER)
ARCHITECT: SKIDMORE OWINGS AND MERRILL (SOM) AND WS ATKINS AND PARTNERS OVERSEAS
PROJECT MANAGERS: MACE INTERNATIONAL
LIGHTING EQUIPMENT SUPPLIERS: NEOLEC LIGHTING, DEXTRA LIGHTING, DELMATIC LIGHTING MANAGEMENT SYSTEMS
PICTURE CREDITS: PAUL ROBERTS ( SENIOR PROJECT ARCHITECT, WS ATKINS AND PARTNERS OVERSEAS)

The new Arcapita Headquarters building in Bahrain combines a dramatic location with innovative sculptural forms, which results in a distinct sense of place for business and arts uses. The project provides a significant architectural presence that has an immediate impact and creates positive and exciting associations for the Arcapita Bank.

Lighting consultants from dpa consultants worked in conjunction with the project team, which included the client, architects Skidmore Owings and Merrill (SOM), WS Atkins and Partners Overseas, and project managers Mace International, to produce lighting solutions, in terms of aesthetic requirements and functions, for the prominent and significant project.

Balancing Day Lighting and Thermal Comfort
Situated within the Bahrain Bay Development off the north coast of Manama, Kingdom of Bahrain, the Mosque comprises of a concrete shell that is clad internally and externally with natural stone. One of the main goals of SOM for AHQ Building and East Park Mosque was to provide a productive work environment that balances day lighting and thermal comfort.

Natural light is provided within the Mosque glazing on the ground floor and through feature windows that are cast into the faces of the structure. In order to highlight this feature during nighttime, dpa lighting consultants proposed concealed linear fixtures within the cladding slot feature. This reinforces the iconic identity of the building whilst providing a low energy, maintainable and practical solution.
The design intent of **dpa** was to achieve a lighting installation to:

- Reinforce the iconic identity of the building at night.
- Create a complimentary, contrasting and stunning appearance to the Mosque’s unique architectural detailing at night.
- Fully integrate the exterior lighting into the architecture to be "invisible" during the daytime.
- Avoid any upward spill light and be totally dark sky friendly.
- Be extremely energy efficient (Mosque approximately 5 W/m², Minaret approximately 2.5 W/m²).
- Utilise very long life lamps to minimise any maintenance requirements.
- Utilise an automatic lighting control system to provide the client with full control and ensure that the lamps are only in operation when and where required.
- Provide excellent value for money.
- Cause no problems of discomfort or disability glare to either worshippers within the Mosque or to passers-by.

All of the above criteria have been achieved utilising two fairly conventional and well-proven lighting systems, but applied in very specific and closely detailed ways:

- A total of 188 dimmable 1390 mm cold cathode lamps (with electronic high frequency control gear for minimum losses and optimum power factor correction) have been utilised, concealed within the upper part of the unique geometric window slot feature details on all four facades. These provide downward lighting only (no direct upward light pollution) and have been carefully located behind baffles to avoid any direct viewing of the lamps or spill light beyond the façade boundary. Cool white (4,000K) lamps were chosen to compliment the external natural stone finish.
- 56 quantities of twin lamp ‘weather-proof’ 1500 mm fluorescent battens (also fitted with electronic control gear) are recessed within a perimeter bulkhead detail. They have been concealed behind glass diffusers to achieve a continuous light-line around the base of the Mosque, reflecting in the adjacent water body and also provide perimeter circulation lighting.

A similar, but inverted lighting solution was also applied to the adjacent freestanding Minaret to create "mirrored" harmony to the adjacent Mosque. 36 single lamp weather-proof battens have been located at the base of the Minaret window slot details to achieve a desired effect. These are very easily maintainable from within the Minaret.

To complement the Mosque and Minaret lighting, linear LED ‘L’ shaped arrays have been integrated into junctions between paving to reflect the slot design on the Mosque cladding and provide graphic shapes that act as a visual guide to the Mosque, rather than dominating the feature.
‘Luminous’ Interactive LED Public Art Platform
Darling Quarter, Sydney
The ‘Luminous’ Interactive digital art platform is a permanent installation that is present solely for illuminated digital ‘art’ – both animated and static. Billed as the world’s largest interactive light installation, ‘Luminous’ officially opened in the Darling Quarter Precinct in the Sydney Central Business District (CBD) on 18 May 2012. The new precinct has ambitions to become Sydney’s most loved community hub.

The large new ‘Luminous’ digital art canvas uses advanced LED systems, manufactured by Australian architectural lighting specialists Klik Systems.

The ‘canvas’ extends over four levels of two campus-style buildings, covering 557 windows in total, and presents a digital façade spanning a distance of 150 metres.

Klik Systems have been supplying bespoke linear lights to architects and designers for over 25 years. Based in Eastern Creek, with international agents across the globe, Klik Systems were also joint sponsors of SPARC lighting design at the Museum of Modern Art, which ran from May 25 to June 11 as part of the Vivid Sydney 2012 festival.

Said Cliff Hadley, Klik System’s International Sales & Marketing Manager, “We’re delighted to be expanding our portfolio to include art projects such as Luminous.” He added, “We’re thrilled to participate in Sydney’s ambitious public art programme, and be particularly committed to art where light is the medium.”

Joint Collaboration
The Commonwealth Bank of Australia, which occupies the building, is a joint partner in the project along with The Sydney Foreshore Authority and Lend Lease. Together, they chose Bruce Ramus as the first design artist and artistic director of content for Luminous. Canadian-born Ramus made his name lighting stage shows for U2 and David Bowie, and is the design mentor for the Sydney Opera House.

Lend Lease designed and constructed Darling Quarter for owner APF Commercial, and first proposed the idea of a permanent space for illuminated art at the area.
The Darling Quarter precinct includes a community green, children's playground, and a large number of world-food restaurants, cafes and bars, and reflects Lend Lease's enthusiasm for iconic new spaces for future generations.

Painting of Digital Designs by the Public

The digital façade goes live in action six evenings a week from 7:30pm. On Tuesdays, Wednesdays and Thursdays, it displays ‘soft’ images such as clouds or waves; and on Fridays, Saturdays and Sundays, the project comes into its own, displaying artworks that invite debate and make art critics – and artist - of every citizen and visitor.

From Friday through Sunday, interactive consoles in the park allow the public to ‘become David Hockney’ and paint their own digital designs on the buildings. Web surfers can also participate via phone app or computer through a dedicated website at My Interactive City. A five-minute time-lapse allows for editing in case of malevolence.

On the Darling Quarter digital façade, each window of the buildings forms a ‘pixel’ in the canvas, lit with Klik Systems’ energy efficient LEDs. ▼

Seen from a distance, they can form a coherent animated picture, should the artist want that effect. A sophisticated colour palette is available, thanks to a white chip added to the usual RGB colours. The system is also capable of integrating music; graphic synchronisation allows for sound-based designs to be projected onto the canvas, like a giantarty Karaoke.

Timber louvre blinds across the 555 windows provide a solid background, and Klik’s linear LEDs running along the windowsills have been angled upwards with a 10-degree spreader lens, designed to create an indirect light source on the back surface of the blinds. The site called for a design small enough to meet the brief but large enough to house the control equipment. “We beat an international field of competitors to win the contract, because we were the only company able to build and produce a fitting this small. Everything had to be fully customised,” said Cliff Hadley at Klik.

The entire project offsets almost all its energy use, thanks to photovoltaic panels on the roof of both Darling Quarter buildings, which provide power for the entire project.

For more information, please visit the following websites:
Darling Quarter - www.darlingquarter.com/about
Contribute Artwork - www.myinteractivecity.com
Ramus Illumination - www.ramus.ca
Klik Systems - www.kliksystems.com
Lend Lease - www.lendlease.com
Sydney Harbour Foreshore Authority - www.shfa.nsw.gov.au

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Lend Lease - www.lendlease.com
Sydney Harbour Foreshore Authority - www.shfa.nsw.gov.au
BMW Showroom

Paris, France

Architecture: Carbondale Architects
Lighting Design: Mindseye Lighting Design (www.mindseye3d.com)
Mirror Art Piece: Ubersee
Media Wall Design, Procurement, Installation, and Project Management: Mindseye Lighting Design
Vortex Ceiling and Rods: Mindseye Lighting Design
Media Wall Content: Mindseye Lighting Design
Picture Credits: Mindseye Lighting Design

Mindseye Lighting Design has developed possibly the most sophisticated car specific lighting strategy ever devised, and the final results - launched at the recent BMW showroom opening on the prestigious Avenue George V - are spectacular.

Having worked with many members of the established lighting design community, Eric Carlson of Carbondale (luxury retail design specialists) decided this project needed a fresh integrated and highly creative approach considering light as a key element from the outset. Above all, he was looking for "creativity, capability and communication". He was recommended to Mindseye and found just what he needed in the design team of Douglas James, Admir Jukanovic and Will Earl.

"Carbondale designers have an incredible and instinctive understanding of the role that light plays in a luxury retail environment. Their design process is super fluid and allows for fast and highly creative development and assessment of ideas. It’s an inspiring environment for any designer," commented Douglas James, Director and Founder of Mindseye.

"When you review the completed installation, it is immediately obvious that light plays a major role in supporting Carbondale’s sophisticated approach to the brand, the use of space, and the needs of the operators and customers," added Admir Jukanovic, Associate at Mindseye.

The first of these luxury brand stores is divided into three areas:

**Display Front**
The storefront window is the largest single pane window used in a European Store front. This serves as a huge Vitrine, drawing attention to the space and the two cars, which stand proud, like gallery or museum pieces. The volume is wrapped on three sides by a unique frosted glass wall, which is also a low definition media wall capable of showing specifically developed content.

This architectural feature provides a dramatic backdrop to the cars and has a powerful impact on the street presence of the façade.

Another key element to the space is the 45-degree angled mirror surface, which reflects the top view of the vehicles. The mirror is a piece of innovative LCD art commissioned specifically for the store, formed of composite polished stainless steel overlaid with LCD laminated layers. These LCD elements are triangular modules, which are also programmable and operate both dynamically and in unison with the LED Frosted Glass wall.

The combined effect is sublimely fascinating and brings a sense of exhilaration to the experience of visiting a BMW showroom, which is unique and entirely suited to the brand values of BMW.
Comprising 232,000 LEDs, the 72.5m² media wall was designed, sourced, installed, project managed and commissioned throughout by Mindseye. Uniquely, Mindseye also designed, developed, generated and uploaded the media content.

Visitors to the store will see part of the content loop, giving an incredibly dynamic and engaging backdrop, specific to the models on display. The accompanying soundtrack was inspired by individual car sounds taken directly from the BMW sound laboratories in Munich. Mindseye now has the green light to deliver this system and content for future BMW Brand Stores in London and New York.

An innovative element developed by the Mindseye team is the inclusion of RGB and White LED pixels, to allow a full colour spectrum from pastel tones to intense colour and strong clean white light. The colours generated are sumptuous and rich with subtleness and delicacy, which is certainly not the usual hallmark of LED generated screens.

**Showroom Central**

Inspired by lighting techniques usually used only for car photography, Mindseye created a ‘sky’ above each vehicle: A disc of illumination reveals the body shape, curves, smooth lines and bodywork details beautifully. ▲

The disc is created with a Barrisol stretch membrane that is perfectly backlit with programmable LEDs for delivering colour and dynamic effects, creating the impression of movement across the car’s bodywork and windows, and bringing a dynamic element and sense of fun and excitement.

A vertical element was conceived by Carbondale which gives rise to the ‘vortex’ shape. Rods rise from the edge of the ‘podium’ created with quartz Terrazzo, to connect to the perimeter of the ceiling disc. The two discs are then rotated in opposite directions, resulting in the rods being angled between floor and ceiling and creating the emblematic vortex shape.

Each rod is a custom designed and fabricated Aluminium extrusion with a custom LED lighting element within each side, facing inwards and outwards. The external LEDs are programmable and can be controlled via interactive signals provided by laser sensors concealed within the ceiling. As a person approaches the outside of the vortex, the lighting on the outer face of the rods is affected, creating an interaction between the viewer and the vortex. A total of 656 metres of custom LED rods were created to make up the individual Vortex’s.

Surrounding each 8.5 metres diameter disc, there is a slot with concealed spotlights, which provide highlight and drama to key elements of the car. The combination of ceiling disc, rods and spotlights is spectacular; cars have never been this well lit.

Perimeter lighting defines the extent of the area with no visible downlights anywhere in the space, resulting in a clean and aesthetically pleasing ceiling. The light is exactly, and only, where it is needed: on the cars and the perimeter merchandise walls.

**Lifestyle Store**

▲ In this high-end boutique for luxury branded goods, lighting is provided by a combination of integrated lighting within display units, trough recessed spotlights and ambient linear elements.

Track spotlights allow the merchandise to be efficiently illuminated by the use of flexible spotlights, which include interchangeable reflectors. It is an entire LED lighting scheme, which means very low maintenance and energy consumption is kept to a minimum.

Carbondale understood from the absolute beginning of the project how crucial the role of lighting would be to the overall success of the store. Because of this, they invited Mindseye to participate in the earliest possible stage, before there were even any potential layouts. In this way, a design was allowed to develop that really delivers exactly what the project was fundamentally about – Cars, Architecture, and Light.
Maidstone Museum
Maidstone, Kent, UK
Designed by Hugh Broughton Architects, the £3m refurbishment of the East Wing of the Maidstone Museum had its architectural lighting tools supplied by Whitegoods Lighting. Providing an extra 30 percent of display area for the Museum’s 660,000 artefacts and specimens, the East Wing extension is quite literally a treasure trove.

The exterior is clad with ‘gold’ coloured copper alloy shingles, making a sharp contrast to the brick façade of the Grade II listed building. With lighting design by AECOM and products supplied by Whitegoods, the classic old building has now been sympathetically brought into the 21st century.

Project Architect and HBA Associate Gianluca Rendina said, “We selected the Whitegoods Linear fittings because they are beautifully engineered and they offer a visual simplicity that works very well as a counterpoise to the craftsmanship of the existing listed building.”

Whitegoods 60 Linear continuous lengths make a visual impact with clean lines delineating the space to the new entrance of the museum, while Whitegoods Standard length 60 and 100 Linear products have been used in the refurbished part of the building to harmonise with the feature lighting and to navigate the visitors through link and corridor spaces.
The East wing provides new and refurbished gallery spaces, including the Japanese gallery, which is now home to one of the museum’s highlights; a significant display of Japanese Art from the Edo period.

In this area, 5-metre lengths of plaster-in continuous 60 Linear lights are mounted within a sloping ceiling lending a contemporary air to the gallery in line with the design of the space and its exhibits.

Whitegoods 100 Round directional gimbal downlights were used for accent lighting of exhibits in key areas of the museum, such as the Canoe Gallery (below ▼) and the Glass Room (bottom right ▶).
The Shard
London, UK

Lighting Controls: Delmatic Lighting Management Systems
Picture Credits: Sellar Group, Paul Wilkinson, Tomasz Sikorski
The Shard in London is the tallest building in Europe, and, from its position, it is just metres from the banks of the River Thames, piercing the sky as it rises more than 1,000 feet (310 metres) into the air. The faceted spire recalls the historic church steeples and masts of boats featured in original engravings of London, while the tapered façades contain 11,000 glass panes, which reflect sunlight and the sky, causing the building appearance to change according to the weather and the seasons.

The Shard, designed by Italian architect Renzo Piano, comprises 60,000 m² of office space, mid-level restaurants, a five-star luxury hotel, private apartments, and a public viewing gallery offering 60 kilometres of panoramic views across the City of London and beyond.

The tower forms part of the £2 billion London Bridge Quarter development, which includes the integral adjoining 40,000m² office building called “The Place”, major improvements to the London Bridge rail and transport hub, as well as a public piazza, a museum, and local regeneration programme.

Lighting Control System for Flexibility

The building is equipped with a site-wide lighting control system from renowned international supplier, Delmatic. The system controls lighting throughout front-of-house, shell and core areas of the tower, as well as providing fully flexible control within the office fit-out areas: The system also provides comprehensive testing and monitoring of emergency lighting throughout the building.

The system also extends into the “The Place” office building.

The Delmatic system uses the International Standard Lon open protocol (ISO 14908) for communication between all items of hardware, and combines this with the DALI open protocol for switching, dimming and monitoring of DALI luminaires. The project is an innovative example of the application of DALI technology and provides a textbook study of how to use a variety of DALI controllers and approaches to optimise control while minimising configuration on site.

Selecting the Most Appropriate Control System and Strategy

The challenge on a project is to select the most appropriate control system and strategy in the context of building usage and budget, bearing in mind that requirements differ within the various areas of the building. Shell and core areas do not need a high degree of flexibility, yet office areas certainly do if they are to be able to adapt to changing requirements of tenants and clients over the lifetime of a building. Other considerations are the electrical installation approach and the ceiling structure.

DALI controls are used throughout the building – within offices, corridors, lobbies, staircases and toilets – and yet the technology is applied in a way which best matches the control flexibility required, with the preferred method of electrical installation as well as minimising the need for on-site addressing of the DALI ballasts. And although the system application in each area is different, all areas are managed and monitored from a single head-end PC.

Emergency lighting too is centrally
monitored and tested with the means of monitoring, again, different within each area. DALI intelligent emergency packs, DALI photocell monitoring devices and DALI photocell monitoring devices were selected to suit the light sources in an area yet all of them are centrally monitored through the head-end PC.

The system combines automatic and password-protected manual central control of lighting from the network PC with local control from ceiling-mounted presence detectors and multisensors.

Graphical network software enables complete management and monitoring of the lighting installation, and allows switching and dimming arrangements to be adapted in real time through drag-and-drop virtual wiring.

**DALI Controls for Office Areas, Lifts, and Stairways**

The project uses a variety of controllers including plug-in DALI modules for office areas, plug-in switching and dimming modules within lift lobbies, DALI buswire modules for staircases and DALI broadcast modules for washrooms: the selection of modules takes into account the installation methods. The system within office areas provides total flexibility of control with individual DALI dimming and monitoring of each luminaire. DALI Plug-In modules provide ten individually addressed DALI dimming outputs yet require no on-site addressing of the DALI ballasts so reducing the on-site commissioning period: Plug-in DALI control also simplifies maintenance as replacement ballasts do not need to be addressed. Multisensors within the office areas switch lighting based upon occupation of individual areas, while also dimming lighting based upon the extent of daylight.

Graphical virtual wiring software enables office switching and dimming arrangements to be configured to suit fit-out office layouts, while tenants may also customise their domain through the addition of infra-red devices, sensors, scene-setting, IP telephone and web-browser control.

The desire in staircases was for lighting to activate ahead of people as they walk up and down the stairs, so individual addressing of DALI ballasts along a common buswire met the operational requirements and best suited the installation approach. Staircase luminaires connect to Delmatic DALI Buswire Modules, which control lighting across sections of five floors as well as monitoring emergency lighting. DALI Presence Detectors connect direct to the DALI bus (saving cabling) and the system is configured such that triggering a sensor on one floor also energises lighting on the two floors above and below.

**Controls For Emergency Lighting**

The Delmatic lighting management system provides automated testing of the entire emergency lighting network in accordance with BS EN 50172. Each DALI emergency device comprises a node on the Delmatic system and is monitored and displayed on the network PC graphical screens.

A test of emergency lighting may be initiated from the network PC (based upon a scheduled command or manually [password protected]), manually from a test key switch within the BMS and Security rooms) and the system generates reports of the tests detailing the pass/failure status of the emergency luminaires.

**About Delmatic**

Delmatic are leading international suppliers of advanced lighting and energy management systems, and have equipped many iconic buildings in London (including the Gherkin and Tower 42 – originally the tallest building in London) as well as on the international scene. For more details, please visit the Delmatic website at [www.delmatic.com](http://www.delmatic.com).