

LED BAY LIGHTING PARKING LIGHTING

Smart Lighting for Car Parks

ADNEC Car Park

Abu Dhabi National Exhibition Centre, UAE



GigaTera®
beyond light



ADNEC Car Park

ADNEC Car Park in Abu Dhabi, UAE

Summary

This replacement project was carried out for the two Parking Structures of Abu Dhabi National Exhibitions Centre (ADNEC), the biggest Exhibition Centre in the UAE built in 2007, with the biggest independent parking structures in Abu Dhabi. The exhibition centre has an event space of over 73,000 m² and can simultaneously accommodate multiple exhibitions through its 12 interconnected halls. Most commonly used during multiple exhibitions held at the Centre, the need for an efficient flow of traffic through the structures is extremely important to ADNEC. The two parking structures, 8-storeys each, has the capacity to simultaneously accommodate over 6,000 vehicles in total.

On studying the difficulties and challenges faced by the facility management team at ADNEC, the parking structures' operation of over 12 hours a day, and 24 hours in some dark areas, put continuous stress on the existing T5 tubes, which caused a significant impact on the short lifetime of the T5 tubes and lumen depreciation that requires repeated replacement of the tubes. Not to mention the poor light output which made it difficult for users to navigate around the parking area.

The two 8-storey each parking structure contained over 8000 fixtures, which made it difficult to operate and maintain, which was the biggest challenge faced by the team. Moreover, at low levels of output, energy consumption was also quite high.

Installation Data

	Before	After (GigaTera LED)
Model Name	IP65 Conventional Batten Lighting (2x28W – 1.2m T5 Fluorescent)	SORA-32W (1.2m) equipped with Smart Parking LED Solution
Power Consumption	56W	32W
Color Rendering	60	>80
Fixture Quantity	8250 ea.	8,250 ea.
Total Power Consumption	462 kW	264 kW (without dimming) 79.2 kW (30% Output by wireless dimming)
Energy Savings		43% - 83%*
Average Illuminance	120lux	150lux



* - Based on Maximum Energy Savings Case by Wireless Dimming



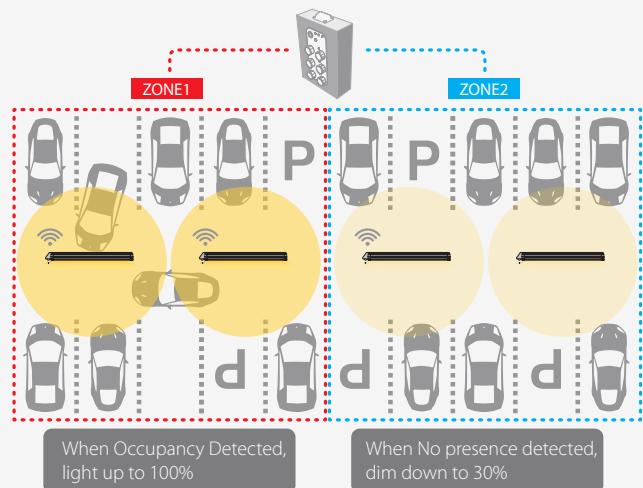
Site Information

Application
Location
Light source
Lighting Support

Batten Lighting for Parking Area
ADNEC, Abu Dhabi, UAE
SORA-32W, 5000K
GigaTera Middle East

How the Smart Parking LED Solution Work?

Each parking level is divided into multiple Groups (Channels), depending on the space of the parking lot. Each group is carefully studied, taking into consideration the movements of cars, entering or exiting the parking structure. Each group is then divided into multiple zones. Each zone is controlled by a built-in occupancy sensor that lights up the whole zone whenever movement is detected. Whenever there is no movement, the fixtures dim down to 30% output which is appropriate for visibility of users who wanted to find their vehicle.



Example of Wireless Configuration and Operation Description

1 Each parking floor is divided into 2 Groups, where each group has a unique wireless channel number. The channel assignment is carefully assigned on each floor to avoid wireless channel interference. Ex: Channel No. 18, 20 on 1st floor and Channel No. 16, 24 on 2nd floor

2 Each group (channel) is controlled by an IPC Wall Switch. The number of buttons on the switch determine the number of zones in the group (based on the design of the group). Ex: Channel No. 18 is divided into 6 zones (6 button IPC Wall Switch).

3 Each zone is controlled by one SORA-32W with built-in Occupancy Sensor which is installed at the entrance to the zone depending on vehicle movement. Whenever the sensor detects movement, it sends a signal to all remaining SORA-32W in the same zone through ZigBee Wireless Control module, to light up to 100% output. When no movement is detected for a period of 1 minute, the output of the entire zone dims down to 30%.

4 Upon setup, the IPC Wall Switch stores the unique address, zone and channel number of each fixture. Hence, each button can be used to control the designated zone manually. If this button is used, the system shifts from Auto to Manual mode, wherein, all fixtures will respond to the button until the system is shifted back to Auto mode. This scenario is especially beneficial during parking road maintenance, re-painting, etc.

Project

The existing condition of both parking structures operated with 8250 pairs of T5 tubes (Conventional IP65 Batten Lighting) in a 2x28W configuration. The Parking structure was originally designed for an average output of 150 lux with a spacing of 5m between each batten light. However, due to the poor lumen depreciation of the T5 tubes, the lumen output and uniformity was drastically affected – which resulted in constant maintenance requirement.

Based on the operation of the parking structures, this LED replacement project was aimed at significant energy savings by implementing a dimming system, improving uniformity and maintaining the lumen output at 150lux for the entire lifetime of the fixture by applying a maintenance factor of 0.7, thus, reducing the need for maintenance on fixtures and providing outstanding energy savings.

Upon analysing the difficulties faced by the facility management team, and on site-survey results, it was evident that the LED Batten Lighting SORA-32W along with GigaTera's Smart Parking Solution - where fixtures would operate with ZigBee Wireless Control and Occupancy Sensors would optimally meet all requirements, be aesthetically appealing and offer glare-free lighting.

Reducing the total power consumption of fixtures from 462kW (2 x 28W T5 Tubes) to 262.4kW (SORA-32W), an average energy savings of 43% was achieved. With the operation of built-in Occupancy sensors and Wireless Dimming, additional energy savings of 83% could be achieved.

Benefit

The Wireless Dimming solution provided by GigaTera has eliminated additional expenses and obstacles of a Wired Dimming option like costs of installation, cabling, civil works and cable trays. This has also reduced implementation time significantly due to GigaTera's simple one by one replacement solution. Moreover, the wireless implementation has also provided greater flexibility of easily modifying the zone and channel layout whenever required.

Result

This Smart Parking LED Solution has not only given a big margin of 43% - 83% in energy savings, but has also improved overall uniformity thanks to the optimized light distribution of the SORA fixture. However, for an instance of where all fixtures were dimmed down to 30% output (as a result of no movement/presence detected), the maximum energy savings of a staggering 83% was achieved. This gives an additional benefit for extending the lifetime of the fixture. All these improvements combined with increased CRI of over 80, has created an aesthetically improved experience for the users of the parking structures, thereby a better impression of the facility. Additionally, this has also met the client's goals of reducing the need of maintenance of fixtures, and achieving high quality illumination.

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