



# ENGINEERING GREEN TECHNOLOGY – DRIVING SUSTAINABILITY AND INNOVATION

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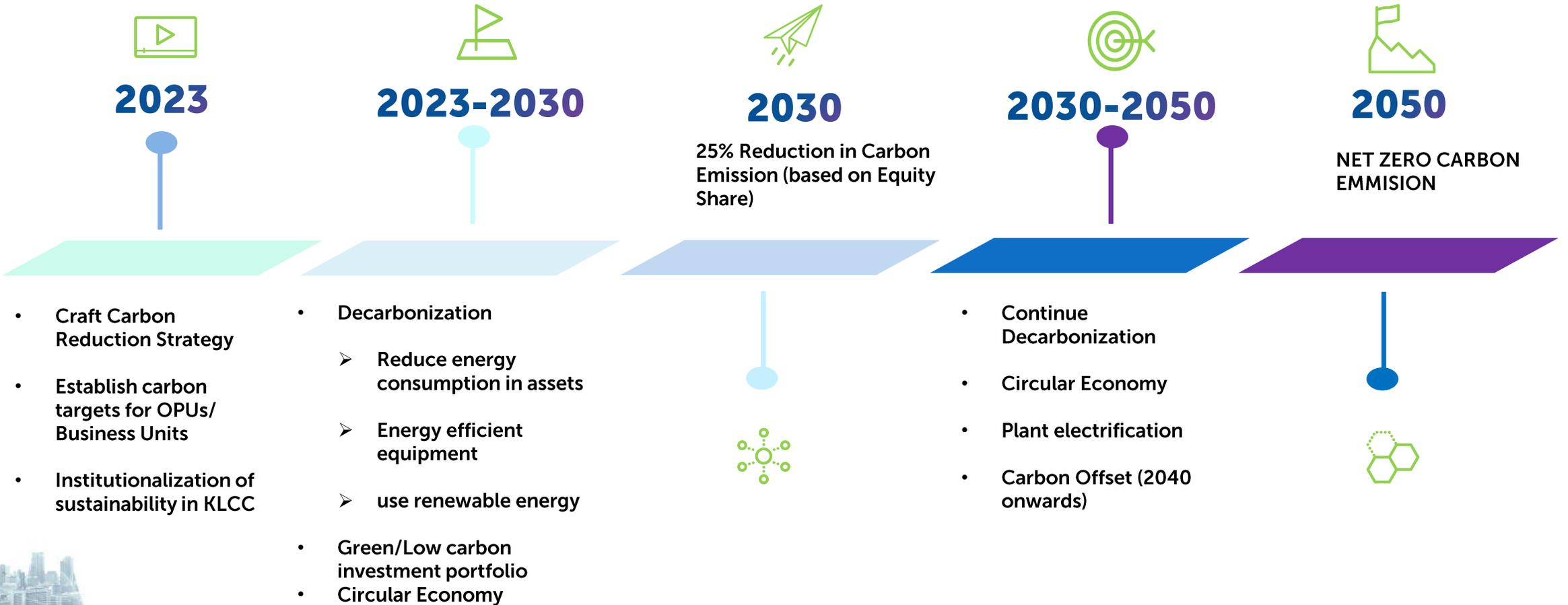
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# OUR JOURNEY TOWARDS SUSTAINABILITY



**KLCC Group aspires to achieve Net Zero Carbon Emission by 2050 supporting PETRONAS**





**In continuously driving sustainability and embracing innovativeness, several initiatives have been implemented including the followings:**

- External Facade Lighting Modernization at PETRONAS Twin Towers (PeTT)
- Establishment of Integrated Building Command Center (IBCC)





# FACADE LIGHTING



# Overview of External Facade Lighting



The existing external lightings with flood light concept has been in operations for more than 20 years. The lightings were designed to illuminate and reflect the steel and glass of the façade material and with silhouette effect.



Daily Operation hours is 6 hrs. from 7 pm to 12 am.

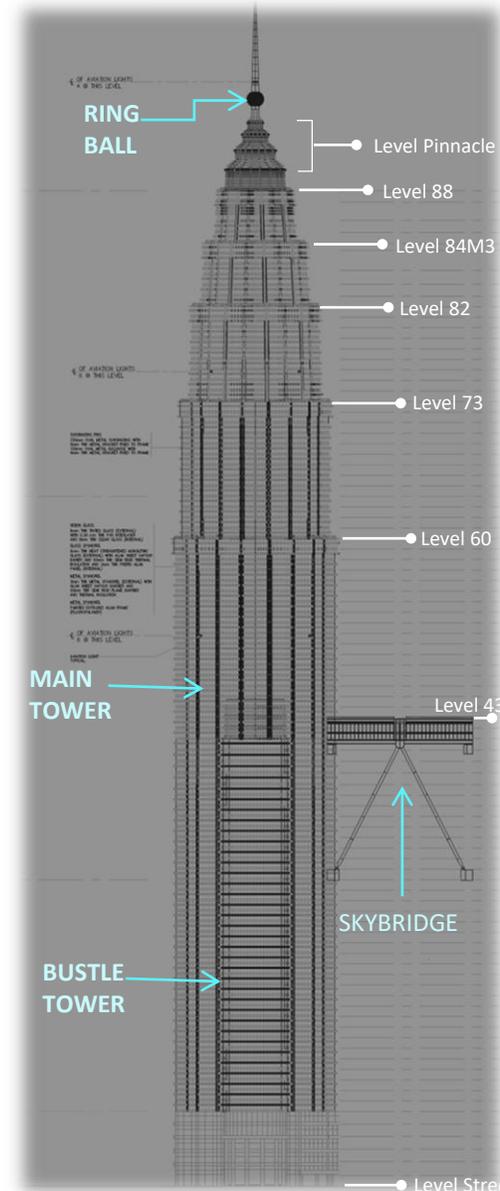


On special occasions such as Merdeka Day, Malaysia Day and New Year Day, the lightings are extended to 1 am.



Previous conventional lighting require special set up and additional cost to accommodate request to color the Towers according to the occasions.

# Review of Night Atmosphere Facade Lighting



# After years of operations, the metal halide lightings performance have declined with high energy consumption & high maintenance cost.



## Conventional Lighting System including Metal Halide bulb and ballast

- High electricity consumption
- Effect the power factors and maximum demand due to high wattage
- Draw a lot of current during startup and have a shorter lifespan on average of 3,000hrs
- Expensive to maintain – maintenance & parts replacement at RM2.8 Mil/year
- Declining performance

## No colour changing feature

- Require special setup and extra cost each time to set up for event



# Modernization of External Lighting provides potential reduction in electricity consumption, longer life span and colour changing features



## Saving of Electricity power consumption



- Minimum 50% as savings relative to existing external lighting system
- LEDs are Super-Efficient and Less-Heat emission

## Reduce annual maintenance cost



- 5 years warranty
- Dimming features
- Less risk of damage (using high quality eco-friendly materials)

## Cost saving in schedule waste management



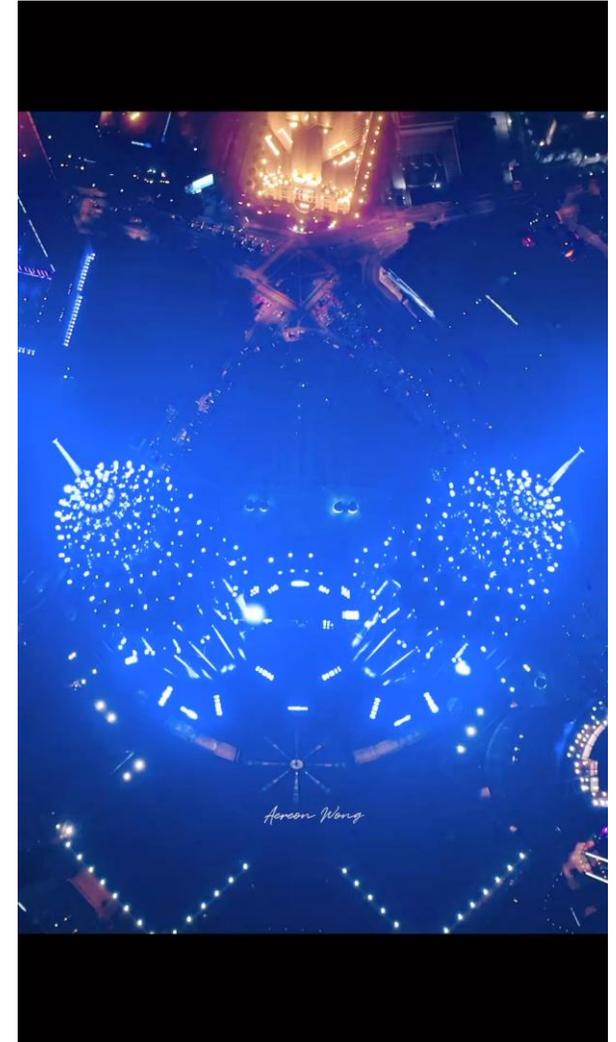
- LED is mercury free

## More light for less energy



- Color changing features
- 800% more light with LED fixtures
- Multi-color support
- Flexible ideas with numerous designs

# The outcome of the building façade lighting featuring color changing ability in accordance with the special events requests



# The outcome of the building façade lighting modernization contributes savings in energy usage more than 50%



Details	1800W Metal Halide	New 770W LED
Cost	RM Mil	RM Mil
Investment Cost	2.52	24.8
Maintenance	2.10	-
Energy (actual reading)	2.35	0.64
Cost Savings p.a.		3.81
Break even (years)		6.5
Analysis of Cost	RM Mil	RM Mil
Energy & Maintenance p.a.	4.45	0.64
Energy & Maintenance 20Y	88.99	12.84
System + EM20Y	91.51	37.64
Cost Savings during Lifespan		53.86

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# INTEGRATED BUILDING COMMAND CENTRE (IBCC)



# INTRODUCTION TO IBCC

Integrated Command Centre  
To manage our facilities from  
a centralized location

Serves as the platform to enable  
Real-Time Operations and  
Automation

## INTEGRATED BUILDING COMMAND CENTRE



# Some pain points which spark the need for change



Building Management System is managed by individual buildings



Our systems were isolated and mostly standalone



Low visibility due to data being scattered in various locations



Manual work processes leading to inefficiency of operations



Tenants' frustration

# IBCC Features



**IBCC was designed in a modular way to monitor and control some key services and subservices as below:**

**Energy Management**



**Life & Safety**



**HSSE**



**Automation System**



**CCTV**



**Vertical Transportation (VTS)**



**Sensor Monitoring System**



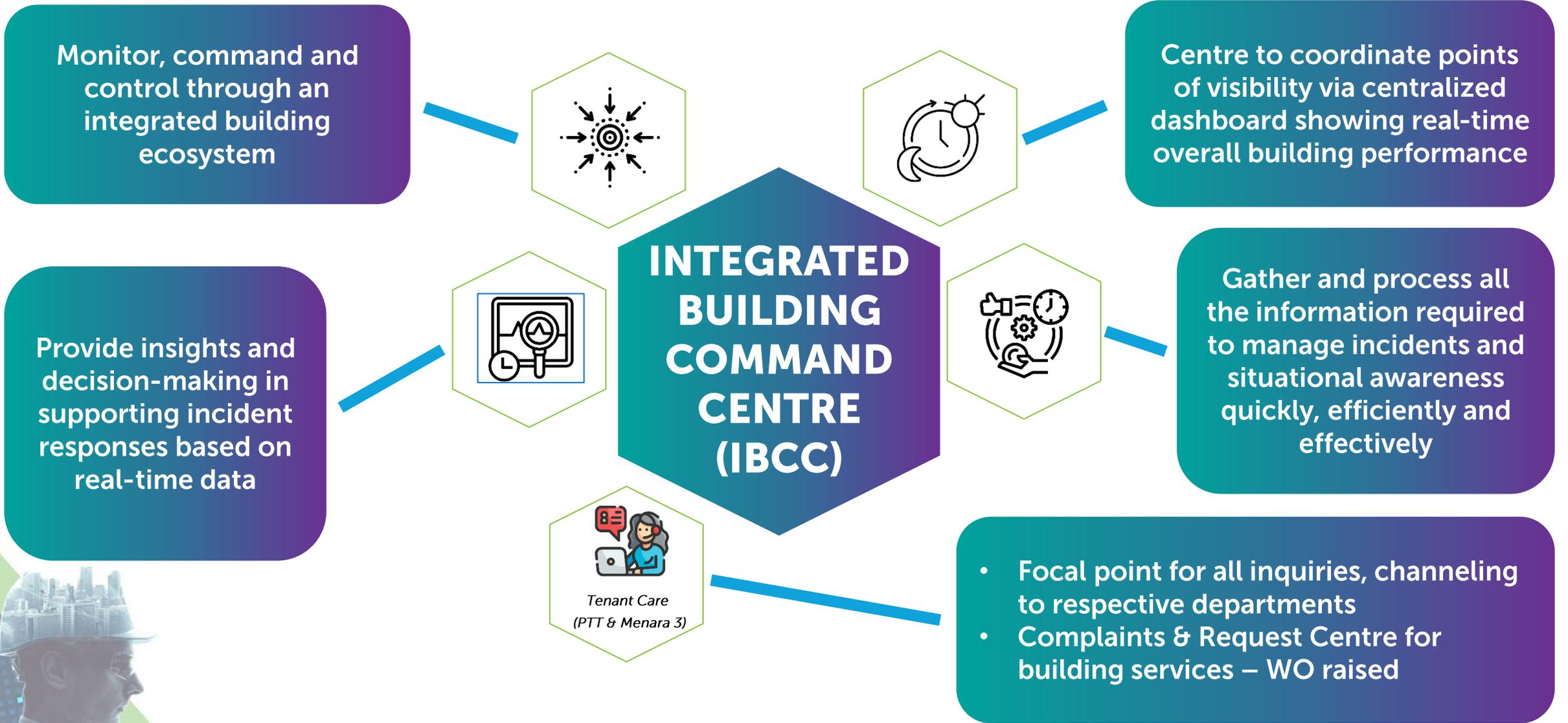
**Chilled Water System**



**Work Order Management System (WORMS)**



# KEY FUNCTIONAL STRUCTURE (IBCC)



# Managing KLCC Park Digitally via System Automation



Reduce risk of working at

Height & in Confined Spaces

Switching and Monitoring of all Pump Rooms

Manual



Remote  
Operation

93%

Reduction of Activities

8,760  
activities

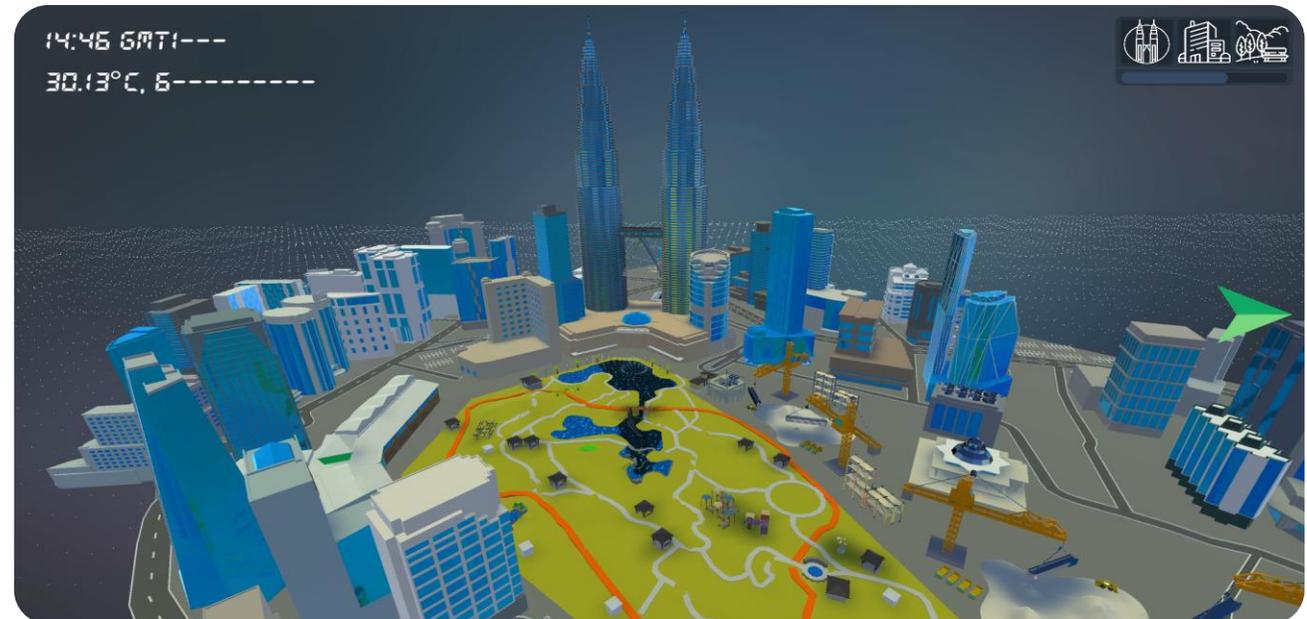
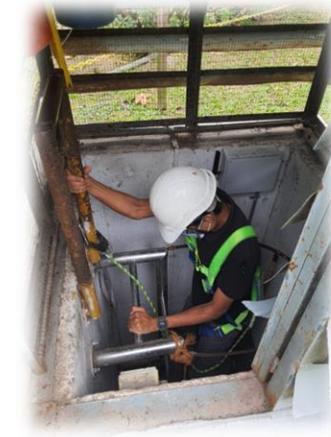


624  
activities

Reduce



- Cost  
- Risk



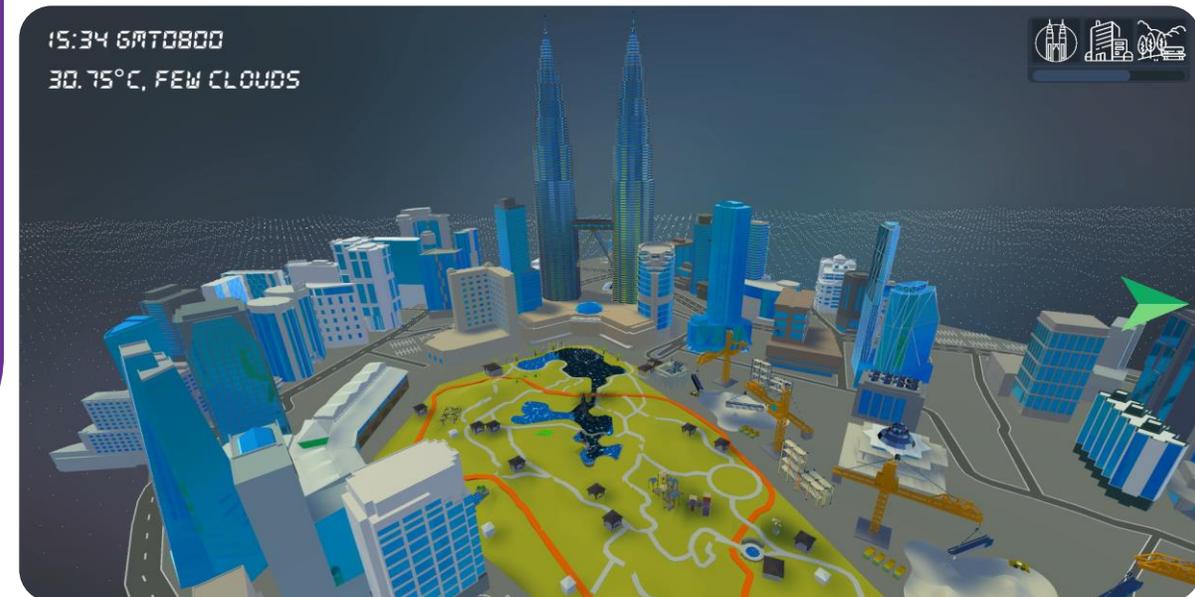
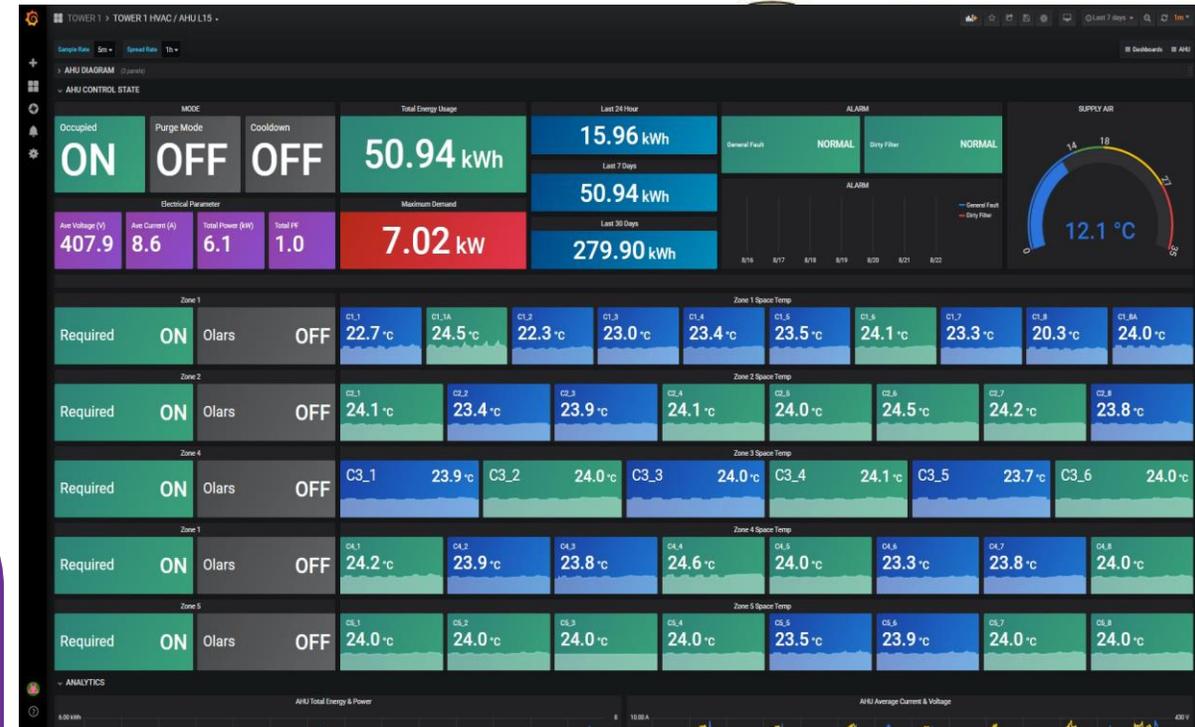
# AHU Monitoring Systems (Tenant Satisfaction)

We often ask:

*"Are our tenants comfortable in our building?"*

Air Handling Units (AHU) are monitored on a real-time basis.

- Determine the zones which space temp exceeds the required setpoint temp, and act proactively
- Adjusting of temp setpoint seamlessly without having tenants to raise request/complaint

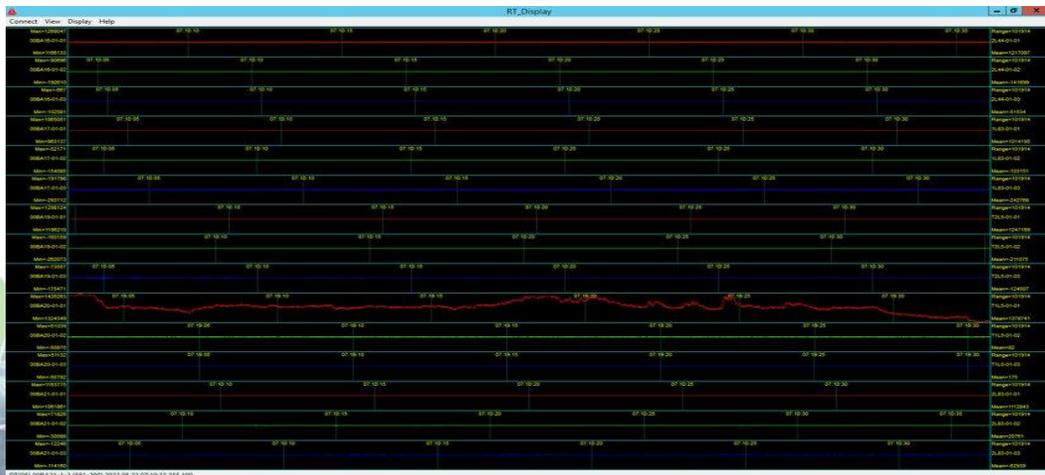


# Structural Monitoring System (SMS)

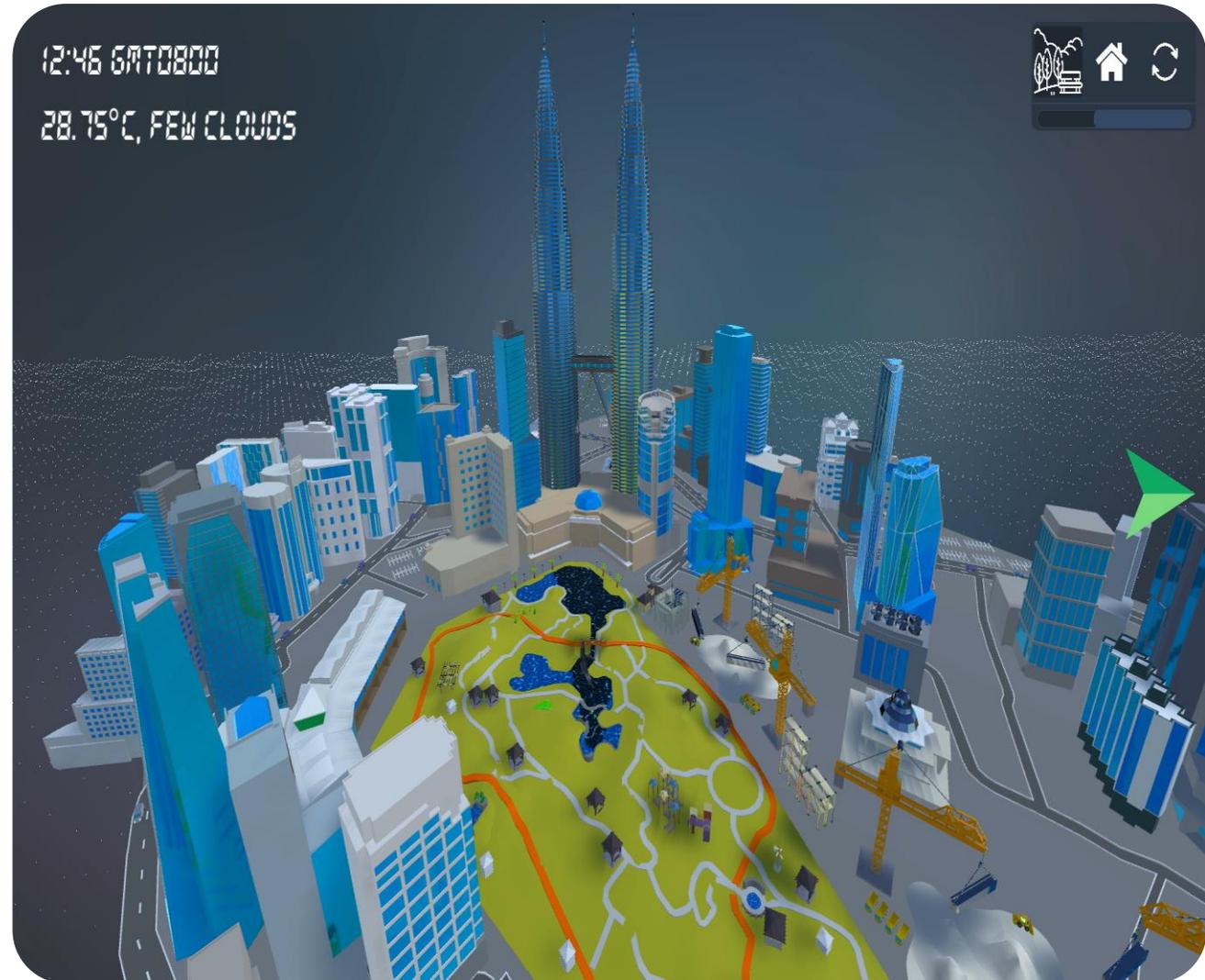


## Real-time information and data collection

- Move from Quarterly reporting to real time reporting
- Monitoring of building sway & vibration
- Alarm threshold for proactive monitoring



PREVIOUS DASHBOARD



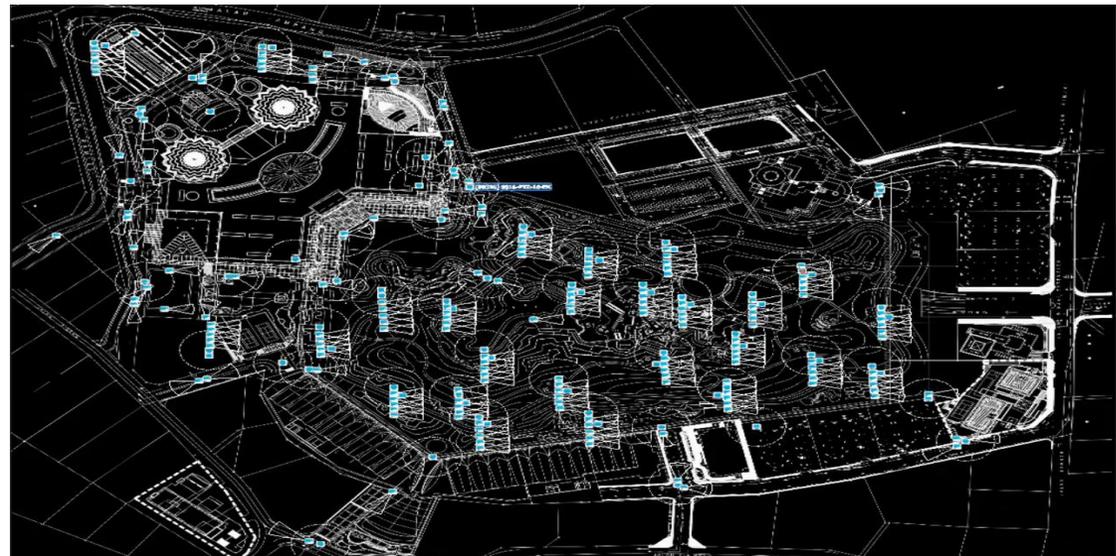
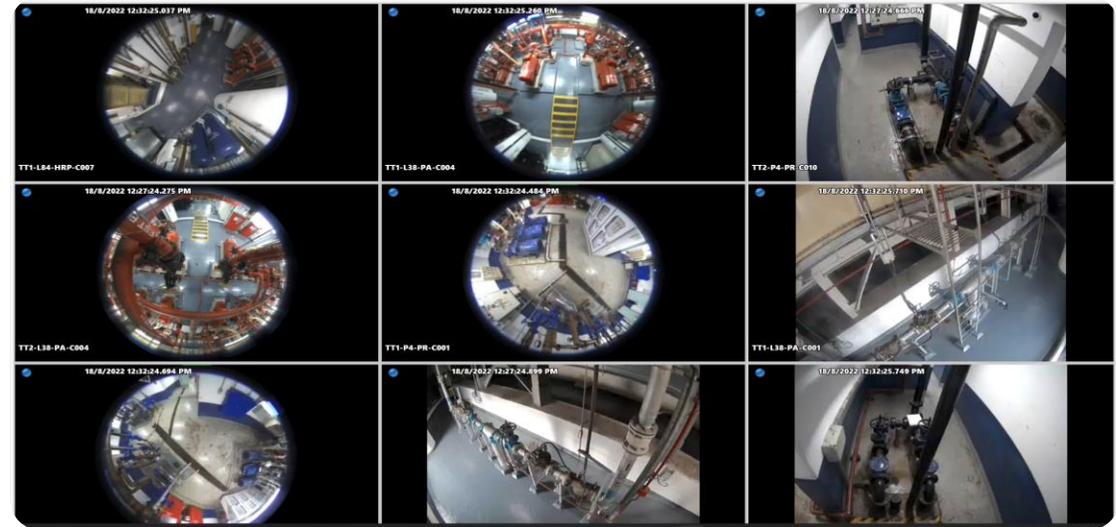
NEW & IMPROVED DASHBOARD

# CCTV Monitoring Systems



Monitoring of the CCTVs on Mechanical Floors & KLCC Precinct Security Management Center(KPSMC)

- 24/7 Surveillance
- Motion detection

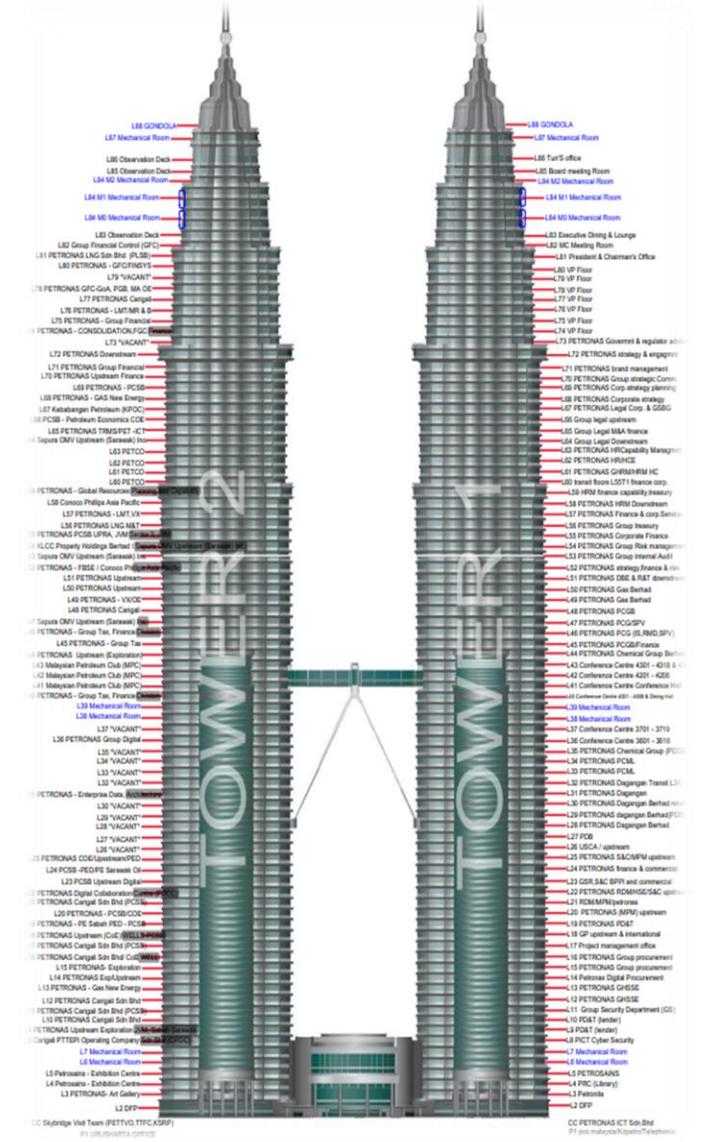


# Real – Time Headcount Monitoring



Viewing of the live headcount of tenants in the building through Card Access System

Ease of tracking on headcount through RFID at exit points during emergency/evacuation.



**REAL Dashboard**

PETRONAS Twin Towers

Home

**Evacuation Status**

Total remaining occupants **6674**

TOWER 1: 3051 | TOWER 2: 3623

Alert Mode:

Alert started at 11:23 AM  
**01h 13m 09**  
Stop Alert

**Evacuation Timestamps**

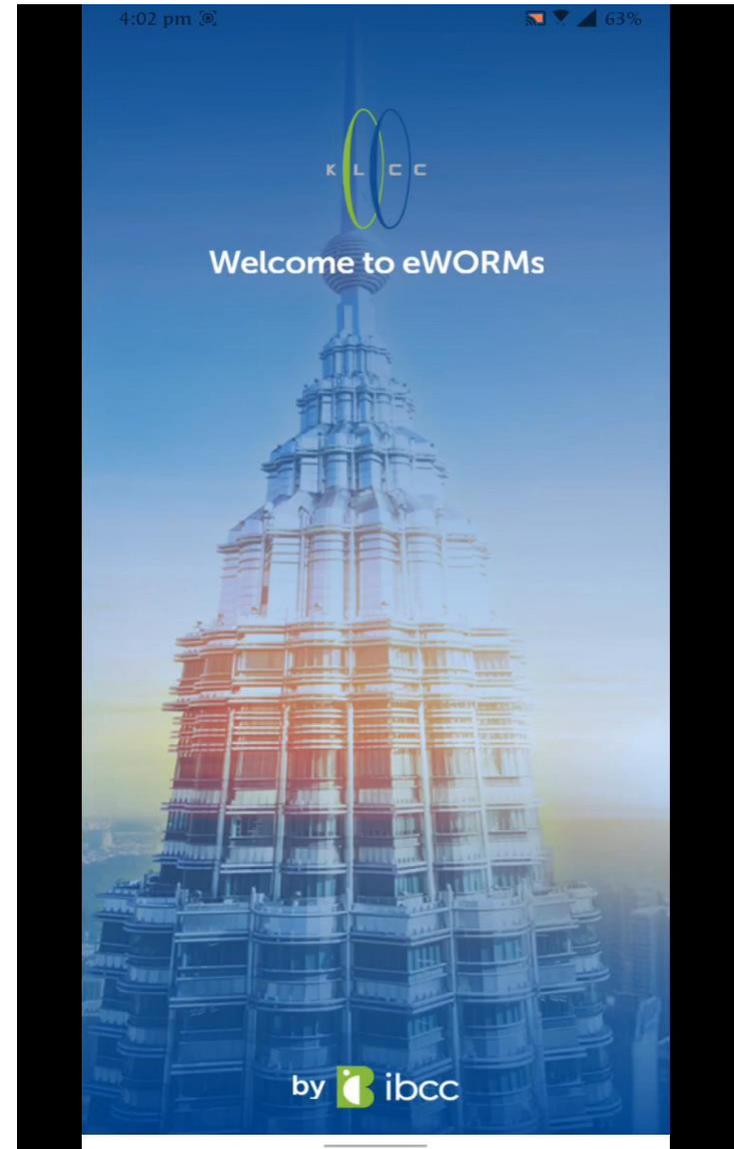
Timestamp	Total remaining occupants	Completion Status	Details
00h 30m 08s (12:36 PM)	7269	0	Details
00h 30m 18s (12:36 PM)	7269	0	Details
00h 30m 29s (12:35 PM)	7269	0	Details
00h 30m 39s (12:35 PM)	7268	0	Details
00h 30m 50s (12:35 PM)	7269	0	Details
00h 30m 59s (12:35 PM)	7269	0	Details
00h 31m 08s (12:35 PM)	7269	0	Details

\*Disclaimer: Number is based on ID detection and does not reflect actual people movement

# Work Order Management System



- Real-time notification and WO closure through a more efficient complaint management system
- Alarm threshold linked to Work Order System through automation



Work Order Management System

291 CRM Request | 1827 Total Work Order

369 In Progress Work Order | 25 Pending Work Order

243 Completed Work Order | 1049 Closed Work Order

290 Exceed Request SLA | 1432 Exceed Completion SLA

Work Order By Maintenance Type

Work Order By Status

Work Order By Service Type

Work Order No	Description	Completion SLA	Work Order Status	Work Order Date/Time	Assignee	Assign To	Service Type	Category	Work Order Type
CWO/PAN101/20228/2651	TANGGA 1 LIGHT BLOWN   TANGGA 2 EXIT SIGN BLOWN   INFRONT TANGGA 2 EXIT SIGN BLOWN	Within SLA	New	18/08/2022 11:55:01	Khairul Anwar Ibrahim	Urusan Teknologi Wawasan Sdn. Bhd.	Electrical	Request	Reactive Maintenance
CWO/PAN101/20228/2650	STAIRCASE 1 LIGHT BLOWN FL & EXIT SIGN   EXIT SIGN BLOWN STAIRCASE 2   HALFMOON FWR NO.2 BLOWN	Within SLA	New	18/08/2022 11:53:53	Khairul Anwar Ibrahim	Urusan Teknologi Wawasan Sdn. Bhd.	Electrical	Request	Reactive Maintenance
CWO/PAN101/20228/2649	1 NOS LIGHT BLOWN IN STAIRCASE 2   EXIT SIGN BLOWN IN STAIRCASE 1	Within SLA	New	18/08/2022 11:49:32	Khairul Anwar Ibrahim	Urusan Teknologi Wawasan Sdn. Bhd.	Electrical	Request	Reactive Maintenance
CWO/PAN101/20228/2648	LEAKING	Within SLA	New	18/08/2022 10:50:08	Azrin Rizal Elias	Premep Facilities Sdn Bhd	Mechanical	Request	Reactive Maintenance
CWO/PAN101/20228/2644	REQUEST NEW PEDESTAL KEY	Out Of SLA	Complete	18/08/2022 09:12:53	Bidzwan Zulhain	NCE Abrash	Civil	Request	Reactive Maintenance

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1 - 5 of 1827 items

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# Q & A





# THANK YOU



*“Committed To Engineering Excellence”*

## **BOARD OF ENGINEERS MALAYSIA**

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