Issue 3 (Jan-Jun 2020)

# GREENRE BUILD

SEMI - ANNUAL BULLETIN

GreenRE
Malaysia's Leading Green Building Certification Body

ISO 9001 Quality Management

*Indoor Air Quality:*
*In The New Normal*

*Ventilation and Indoor Air Quality:*
*A Green Building Perspective*

# i'm livin' it green

**Welcoming McDonald's Setia Alam Drive Thru Restaurant as the first Gold certified project under GreenRE's Restaurant Annex for Non-Residential Buildings**

# Foreword

Dear Readers,

Welcome to the mid-year edition of the GreenRE Build for 2020.

Covid-19 has suspended normality in an unprecedented manner across Malaysia and the World. Our resilience as a nation was put to the test and we have performed remarkably in embracing the collective responsibility of curbing the virus spread through the movement control order. As we begin the slow process of recovery from the economic fallout of this pandemic, we should not lose sight of the overarching climate crisis and the unique opportunity we possess to "build back better". A silver lining from the ongoing pandemic and corresponding global lockdowns has been the glimpse it has offered us of the first steps towards a net zero carbon future in terms of lowered carbon emissions, improved air quality and enhanced biodiversity in many parts of the world. In the built environment, it is imperative that we embrace green building design principles and accelerate our efforts towards "flattening the climate curve".

A key pillar of GreenRE's standards – Energy Efficiency – should be the focus of businesses on their road to recovery. A basic energy audit can identify underperforming components of a building's energy systems (i.e HVAC, lighting, etc). Consequently, upgrading these systems through a swathe of available innovations and combined with the subsequent cost savings in utilities can generate a payback in less than 2 years! This does not include the tax incentives on offer by MIDA that can further accelerate the return on investment. Beyond energy efficiency, incorporation of renewable energy notably solar photovoltaic systems by utilizing unused rooftop space has never been cheaper. REHDA have recently upgraded their headquarters' solar photovoltaic system capacity with an additional 50kWp together with a net metering system to sell excess power generated back to the grid.

The on-going pandemic has not slowed down GreenRE and we have adapted our operations and training programmes to ensure the safety of all involved. Our next two training events will be conducted via zoom and we have a lineup of free webinars covering pertinent green building related topics.

Let's embrace a greener, cleaner and safer future for all and we thank all our stakeholders for your continued support of GreenRE.

**Teo Chui Ping**
Board Member,
GreenRE Management Committee



# Contents

# GreenRE Advisory Panel (GREAP) Meeting (No. 3)

The third GreenRE Advisory Panel (GREAP) meeting was held on the 5th of February 2020 at Wisma REHDA. An annual event, the GREAP assists GreenRE's board to strategise direction, formulate policies and regulate GreenRE's portfolio of standards. The first GREAP meeting was held back in 12th June 2015 and since then it has grown in presence necessitating a widening of GREAP's scope and stakeholder involvement.


GREAP members include a wide range of stakeholders from the sustainable real estate arena, encompassing ministries, associations, and universities. As of March 2020, GREAP members include MESTECC, KPKT, MOT, MGTC, MIDA, CIDB, TNB, ST, SPAN, SIRIM, DOE, Plan Malaysia, PPKM, IEM, MIP, MBMA, BMAM, ACAM, MPIA, IGTC, UTAR, Sunway University, RISM, NUS, UTM, etc.

The 3rd GREAP Meeting was chaired by GreenRE Chairman and REHDA Immediate Past President, Dato' Seri Fateh Iskandar and was attended by 30 GREAP members, including GreenRE Boardmembers, ie. Dato' Ir Soam Heng Choon, Datuk Ng Seing Liong and Ms. Teo Chui Ping.

Topics discussed included the Green Building Tax Incentives, Integration of green building rating tools with Low Carbon Cities Framework (LCCF), carbon footprint calculation, impact of Energy Efficiency and Conservation Act (EECA) to building industry and use of green plot ratio (GnPR) as a metric for planning guidelines in Malaysia. The meeting ends with a lunch banquet started off with the traditional Yee Sang platter in conjuction of Chinese New Year celebration.

# Green Building Awareness Drive 2020

With climate change having an undeniable impact on the way we plan and manage cities, buildings and construction projects will need to take into account all available technologies and best practices to ensure a cleaner and greener environment.

As part of our awareness drive to promote sustainable real estate in Malaysia, we will be meeting professional associations and local authorities across states to introduce GreenRE and the benefits of high-performance buildings.

- **Sarawak Housing and Real Estate Developers' Association (SHEDA), 24th February 2020, Kuching**

GreenRE gave a talk to SHEDA members last February at their headquarters. Around 12 SHEDA members including the President and Secretary General attended the 2-hour talk and discussion session which was presented by GreenRE and ESD Greentech. Topics covered included Green Buildings and Benefits of Certification and High-Performance Buildings Case Studies.

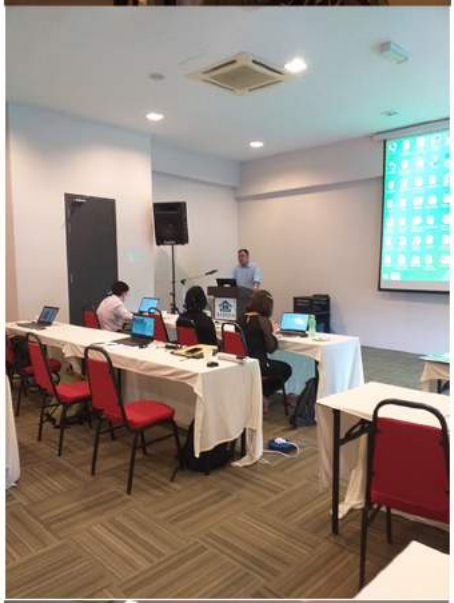
- **Malaysia Shopping Malls Association (PPKM), 10th March 2020, Wisma REHDA**

GreenRE together with Malaysia Shopping Malls Association (PPK Malaysia) hosted a Teh Tarik Talk on Green Malls at Wisma REHDA. Speakers from GreenRE, ESD Greentech and Malaysian Photovoltaic Industry Association (MPIA) covered topics on Green Building Certification for New & Existing Malls, Improving Energy Efficiency of Shopping Malls and Solar Photovoltaic Systems for Malls respectively. Fittingly, the 2 hour workshop ended with tea.

# GreenRE Manager's Course 21st Intake, 18th - 20th February 2020

GreenRE Manager's Courses (GREMC) are 3-day courses structured to provide participants a holistic coverage of green building principles and operations to enable them to participate in the design process, incorporate integrated design and facilitate GreenRE certification. The 21st Intake of GREMC was held on 18th - 20th February 2020 at Wisma REHDA.

13 participants from BSD Consultancy, Chevron Malaysia, G&P M&E, IEN Consultants, Jurutera Perunding Valdun, Mudajaya Corporation, Paragon Ceylon Development, Sapura Resources, UTM and VMW Material Handling attended GREMC-21.



This comprehensive course covers topics such as Passive Design and IEQ, Lighting and Daylighting, Sustainable Construction & Green Products, Water Efficiency, Green Plot Ratio and LAI, Energy Modelling & Ventilation Simulation, Efficient Air-Conditioning, Solar Photovoltaic, Green Tax Incentives, etc. Participants were able to claim CPD points from the following institutions, ie. IEM accredited 15 CPD, LAM accredited 3 CPD, Suruhanjaya Tenaga (ST) accredited 12 CPD and GreenRE accredited 15 CPD.

The course also includes a 2-part assessment; a multiple-choice examination and a case study group project. Participants who pass both parts of the assessment and hold the required criteria are eligible to apply to become GreenRE Managers.

To complement the Managers Courses, GreenRE also runs intensive Technical Seminars (GRETS), 2-day courses on selected topics. The next GRETS will be on Efficient Central Air-Conditioning Design and Measurement & Verification Systems via online, 6th - 8th July 2020.

**The next GreenRE Manager's Course (GREMC-22) will be held in July 2020 ONLINE. Contact training@greenre.org for further information.*

# UPCOMING EVENTS 2020

**Date: 6th - 8th Jul 2020**

**GreenRE Technical Webinar**
*Efficient Central Air-Conditioning Design and M&V Systems*

**GreenRE CPD 5**

**Date: 16th Jul 2020**

**GreenRE Sustainability Webinar Series**
*Episode 1: Optimising the Life Cycle of Buildings through BIM*

**Date: 20th - 24th Jul 2020**
**Examination: 22nd Aug 2020**

**GreenRE Manager's Course**
*Webinar - 22nd Intake*

**GreenRE CPD 15**

**Date: August 2020**

**GreenRE Sustainability Webinar Series**
*Episode 2: Indoor Lighting & Occupants Wellbeing*

**Date: 9th Sep 2020**

**GreenRE Refresher Course 2020**

**GreenRE CPD 3**

**Date: September 2020**

**GreenRE Sustainability Webinar Series**
*Episode 3: Building for the future and biophilic design*

**Date: 20th - 22nd Oct 2020**
**Examination: 21st Nov 2020**

**GreenRE Manager's Course**
*23rd Intake*

**GreenRE CPD 15**

**For further info please contact:**

**Ms Juanita (juanita@greenre.org)**
**Ms Nariemah (training@greenre.org)**
**Tel: 03-7803 2978**

# GREENRE SUSTAINABILITY WEBINAR SERIES

# EPISODE 1: OPTIMISING THE LIFE CYCLE OF BUILDINGS THROUGH BIM

Globally, **BIM (Building Information Modelling)** is becoming increasingly vital and even mandated to ensure the planning, design, and construction of buildings is integrated and highly efficient. This one hour webinar will cover what BIM is, how BIM is used, what BIM levels mean and Malaysia's way forward.

**Speakers**

**Min S. Shih, Ad Astra**
BIM Marketing Strategy; BIM Transformation Obstacles-Policy, Process, People, Technology; BIM Project Lifecycle Management- Little BIM & Big BIM

**CIDB**
Malaysia's Approach to BIM integration and Way Forward

**Episode 1**

**Date: 16 July 2020 (Thursday)**

**Time: 10.30 am**

**Admission is Free**

GreenRE

**Register now at www.greenre.org**

# GREENRE MANAGER'S COURSE 22ND INTAKE WEBINAR

**20th - 24th July 2020 | 10 am - 12 noon & 3 pm - 4 pm**
**Examination Date: TBC**

ELIGIBLE FOR CPD CPD POINTS

GreenRE Manager's Course is a course to equip professionals or technical individuals with knowledge and skills of green building practices to enable them to participate in the design process, incorporate integrated design and facilitate GreenRE certification.

**GreenRE**
15 CPD

**IEM, LAM & ST**
CPD to be confirmed

## FEES

| Course Access Only | Course Access & GreenRE Manager's Examination |
|---|---|
| (15 hours access to Webinar content + Certificate of Attendance) | (15 hours access to Webinar content + Certificate of Attendance + Certificate of GreenRE Manager) |
| *RM 99 **RM 149 | *RM 499 **RM 549 |

*(GREM/REHDA/IEM/BEM/PAM/LAM/ST/RISM/BQSM/ACEM/MIP/MBAM)
**(Non-Member)
***GreenRE Manager's examination can be taken separately (Certificate of Attendance is prerequisite) within one year from the course date with separate course fee. Additional RM499* and RM549** will be charged for the examination.

REGISTER NOW

**https://greenre.org/training1.html**
**or contact**
**Ms. Nariemah (03-7803 2978)**

www.greenre.org | Page: GreenRE | GreenRE Sdn Bhd | GreenRE Sdn Bhd Malaysia

## COURSE OBJECTIVES

- Provide crucial information and knowledge on the best practices and green building principles.
- Understand and reduce life cycle cost of green buildings.
- Legislative requirements on Environmental Sustainability for Buildings.
- Provide an understanding on the interpretation of the GreenRE Tool Criteria, Scores and certification process.

## EXAMINATIONS

The exam measures knowledge about green building, GreenRE rating system and the certification process. The exam is divided into 2 sections. Part A multiple choice test, Part B a group project.

In keeping with our green and sustainable practices, course notes will be available in e-format.

## GREM APPLICATION REQUIREMENTS

- Attended all the webinar contents of GreenRE Manager's Course
- Pass MCQ test and group green building project.
- Professional Experience: A recognised degree or diploma in related disciplines (engineering, architecture etc.), approved by the GreenRE Review Panel, in addition to 3 years work experience (degree holders) or 5 years (diploma holders).

GreenRE Manager Certificate is valid for 2 years from issuance.

## RENEWAL REQUIREMENTS

- Compulsory Attendance for GreenRE Refresher Course OR GreenRE Manager's Course-Basic per renewal cycle.
- Accumulation of Continuing Professional Development (CPD) Points of 10 CPD points per year.

You can attend the GREM course even if you do not wish to be a Certified GreenRE Manager course and certification are independent. The multi-faceted courses will be beneficial for general development as it provides an overview to the topic of green building design and technologies. In such instances, you can choose to opt out of the MCQ Test and group project if enrolment of the course is purely for knowledge.

## COURSE SCHEDULE

| | | |
|---|---|---|
| 20/7/2020 | 10 am - 12 noon | Introduction of GreenRE and Assessment Process<br>Introduction to Green Buildings and Township Tools |
| | 3 pm - 4 pm | Passive Design for Green Buildings and Township Tools |
| 21/7/2020 | 10 am - 12 noon | Overall Thermal Transfer Value (OTTV) |
| | 3 pm - 4 pm | Sustainable Construction and Green Products |
| 22/7/2020 | 10 am - 12 noon | Artificial Lighting and Daylighting |
| | 3 pm - 4 pm | Solar Photovoltaic for Buildings and Township |
| 23/7/2020 | 10 am - 12 noon | Efficient Air-Conditioning |
| | 3 pm - 4 pm | IEQ and Green Innovation Features |
| 24/7/2020 | 10 am - 12 noon | Energy Modelling and Ventilation Simulation |
| | 3 pm - 4 pm | Water Efficiency, Rainwater Harvesting and Green Plot Ratio |

# McDonald's Setia Alam Drive Thru Restaurant

By : Ahmad Thibri Mashri, ESD GreenTech Sdn Bhd


McDonald's Setia Alam Drive-Thru restaurant is the manifestation of McDonald's Malaysia's commitment to sustainability. The single storey stand-alone building, which is located at the heart of Setia Alam, has been skilfully designed by the development team with sustainability as one of the primary design objectives.

This development fulfils almost all of the design criteria for an environmentally sustainable building such as energy efficiency, water efficiency, sustainable operation & maintenance and indoor air quality. As a result of the state-of-the-art sustainable design, McDonald's Setia Alam Drive-Thru restaurant was recently awarded the GreenRE Gold certification, which is the first in the restaurant category under GreenRE.

The development truly supports the pledge made by Malaysia in Conference of Parties 21 (COP21) to reduce 45% of carbon emissions by the year of 2030, with its effective passive designs and efficient active systems. The façade of the drive-thru restaurant is optimally designed to limit solar heat gain while maintaining the quality of daylight penetration into the building. Among the design strategies are optimal window to wall ratio, incorporation of shading devices and green wall as well as appropriate building orientation to minimize heat gain.

The restaurant is equipped with efficient lighting design, in which high performance LED fittings are installed throughout the area. Furthermore, effective daylighting strategies via lighting zoning allows artificial lighting to be turned off, allowing occupants to enjoy natural daylight instead. On top of that, the building is also equipped with an efficient air-conditioning system. As a result of the low external and internal heat gain and effective air-conditioning process, the building consumes very low energy. To top it all, there are also a few renewable energy systems such as solar photovoltaic, solar hot water and LED solar street lighting systems in place.

**DEVELOPER/BUILDING OWNER:**
McDonald's Malaysia
(Gerbang Alaf Restaurants Sdn Bhd)

**ARCHITECT:**
P Y Liew Architect

**M&E CONSULTANT:**
U TechConsultant Sdn Bhd

**C&S CONSULTANT:**
Earth Tech Engineering

**LANDSCAPE ARCHITECT:**
Domain Access Solutions

**QUANTITY SURVEYOR:**
THS QS Consult

**GREENRE CONSULTANT:**
ESD Greentech Sdn Bhd

**MAIN CONTRACTOR:**
Prima Rakan Sdn Bhd

With the combination of the above-mentioned energy efficiency and renewable energy features, the owner of the esteemed development enjoys up to 30% savings on the electricity bill as compared to a conventional restaurant, while also playing their part for the environment.

Water efficiency is also a sustainability area greatly emphasised by the development team. All water fittings installed in McDonald's Setia Alam Drive-Thru restaurant are rated 2 or 3 ticks under the Water Efficiency Labelling and Standards (WELS). There is also a rainwater harvesting system in place, which is able to cater for the restaurant's plant irrigation needs. Additionally, water sub-meters are also installed to monitor water consumption and ultimately to detect if there is any leakage.





Apart from energy and water efficiency, there are many other green and sustainable features incorporated which improves the construction and operational sustainability of the restaurant. This includes a selection of eco-friendly waterproofing and ceiling boards, provision of capture jet fan which improves mechanical ventilation performance in the kitchen area, a selection of low VOC paints which improves indoor air quality, extensive landscape features and an electric charging station. The highlight however goes to McDonald's Malaysia's efforts and commitment to their recycling agenda. Not stopping with just recycling construction waste during construction period, the agenda has been brought forward to the occupancy period where promotion of in-house waste sorting, collecting, monitoring and recycling are in place. The recyclables also extend from common materials such as paper and organic composting to cooking oils where a specific program has been developed nationwide to convert the used oil into sustainable biofuel which is then used by McDonald's dispatch trucks.

The above-mentioned sustainability features incorporated in McDonald's Setia Alam Drive-Thru restaurant, as well as the relevant efforts and initiatives taken throughout the building life cycle have proven the high commitment that McDonald's Malaysia has towards sustainability. The applaudable commitment shall definitely set a very high standard in the industry.



# Overall Thermal Transfer Value (OTTV)

MYTH VS FACT

By: Dr. Ar. Joseph Kong (DME Solutions Sdn Bhd)

The concept of Overall Thermal Transfer Value (OTTV) was first introduced and incorporated into the Malaysian Standard 1525 (MS 1525) Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings in year 2007. Subsequently, a number of states in the West Malaysia amended the Uniform Building By-Law (UBBL) to make OTTV compliance mandatory. For instance, the State of Selangor adopted a new By-Law 38A: Energy Efficiency in Buildings, which requires any new or renovated non-residential buildings with air-conditioned space exceeding 4,000 square meters to be designed to achieve OTTV of 50 W/m2 or below [1].

The main objective of OTTV is to optimise the design of building envelope in order to reduce external heat gain and therefore lessen the cooling load of the air-conditioning system. The OTTV of building envelope is given by the formulas below as stated in MS1525: 2014 [2]:

$$OTTV = \frac{(A_1 \times OTTV_1) + (A_2 \times OTTV_2) + \ldots + (A_n \times OTTV_n)}{A_1 + A_2 + \ldots + A_n}$$

A1 is the gross exterior wall area for orientation 1
OTTV1 is the OTTV value for orientation 1

$$OTTV_i = 15\alpha(1 - WWR)U_w + 6(WWR)U_f + (194 \times OF \times WWR \times SC)$$

WWR is the window-to-gross exterior wall area ratio
α is the solar absorptivity of the opaque wall
Uw is the thermal transmittance of opaque wall (W/m2 K)
Uf is the thermal transmittance of fenestration system (W/m2 K)
OF is the solar orientation factor
SC is the shading coefficient of the fenestration system
SHGC is solar heat gain coefficient

We have had the opportunity and the privilege to work with the Real Estate & Housing Developers' Association (REHDA) as well as GreenRE Sdn Bhd for the past few years to promote OTTV to the industry practitioners via seminars. We enjoyed interacting with the participants from a wide range of interests, backgrounds and working experiences. Particularly, we received valuable feedback from the developers, architects, engineers, facade consultants, maintenance managers, contractors and local authorities with regards to the pros and cons of OTTV. We also took the opportunity to clarify and clear a number of misconceptions about OTTV during our seminars. We shortlisted two (2) of the most common misconceptions and presented them as a "Myth vs Fact" in the following section.

**Myth 1: Compliance with OTTV limit of 50W/m$^2$ is expensive due to the additional investment in glazing.**

**Fact 1:**

OTTV is a measure of the average heat gain through a building envelope and consists of three major components:

1) conduction through opaque walls,
2) conduction through glazing, and
3) solar radiation through glazing.

Therefore, minimizing heat flows through the glazed facade is critical to the compliance of OTTV requirements. Additional treatments like tinting, low-emissivity (low-e) coating, air-gap, etc. are commonly practiced to reduce heat transfer through

glazing system. However, these treatments are often come at a cost and should only be considered after all other possible options have been explored. The passive design strategies below [2] are highly encouraged prior to considering glazing treatment:

- The long directional axis of buildings should be facing North-South. If this is impractical due to site constrains, the project team should explore other building geometries (eg. circular, square, octagonal, etc.), complemented by effective sun-shading devices.

- Minimise glazing or opening at the East- and West-facing facades to avoid exposure to the intense solar radiation.

- Use of building materials with low thermal conductivity that can provide better resistance to heat. For instance, an autoclave aerated concrete block has better thermal insulation properties as compared to a common clay or sand brick.

The above-mentioned strategies should be explored at the beginning of a project rather than after all design decisions have been finalized. During the schematic design stage, an early OTTV analysis enables the project team to identify high performance and cost effective strategies to reduce energy demand. The OTTV analysis can be conducted by manual calculation or computer simulation (Figure 1 & 2). Capital expenditure and operational cost should be integrated into the OTTV analysis to ensure the feasibility of any measures taken. Particularly, the calculated reduction in external heat gains as results of each measure application should be weighed against costs to justify any investment.

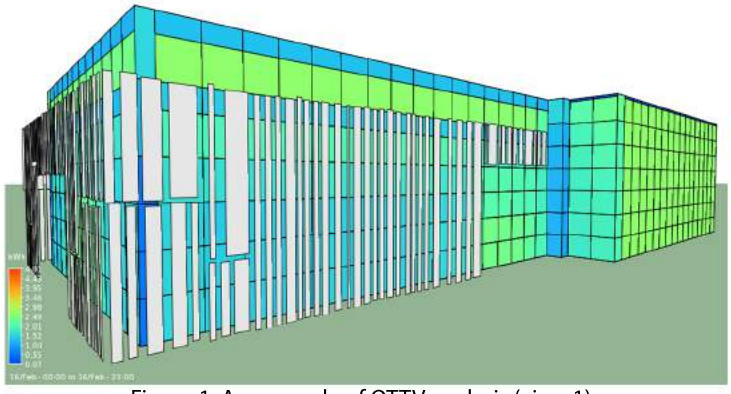


Figure 1: An example of OTTV analysis (view 1)

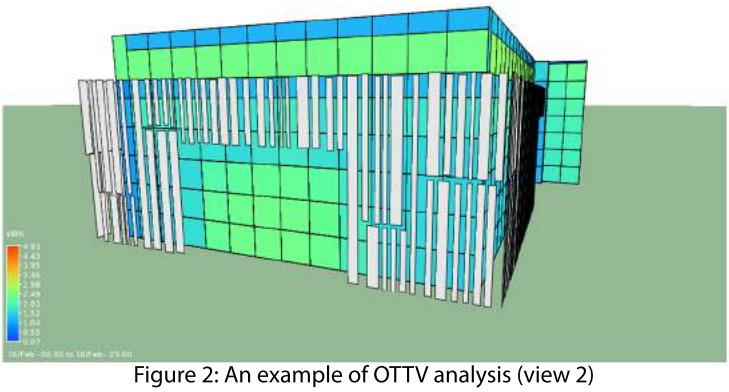


Figure 2: An example of OTTV analysis (view 2)

**Myth 2: Complying to OTTV limit of 50W/m$^2$ will impose a limitation on creative work, resulting in monotonous facade design.**

**Fact 2:** Contrary to the common belief that green buildings achieve their OTTV by placing large walls and small windows on a boring box, an energy efficient building envelop is often an inspiring work combining art and science. The OTTV is an effective tool to benchmark the thermal performance of buildings. It can be used to support design decision-making processes through an analysis of the key factors like sun shading design (eg. vertical, horizontal, egg-crate, etc.), massing, building geometries, orientation, window-to-wall ratio, type of glazing, type of insulation, type of opaque material, etc. Additionally, computer simulation can be performed to evaluate the impact sun-shading devices on daylighting (Figure 3 & 4), external view as well as heat gains. The information can be used to formulate a design direction so that the project team can make informed decisions to optimise indoor environmental quality. The information can also be organized in a table or diagram, highlighting available

design options. The project team can then adopt or reject them, according to the different aesthetic considerations. A well-designed building enclosure can strike a balance between sustainability and beauty. Therefore, the concept of OTTV should be used to broaden the purpose of facade design by incorporating efficiency to aesthetics. It should be noted that physical appearance like shape and geometry directly determine the success and survival in nature. Therefore, aesthetics and performance should not be seen as two opposing components that compete for dominance. They should be treated as two properties that complementing each other.

Figure 3: An example of computer simulation used to evaluate the impact of sun-shading devices on daylighting (view 1)

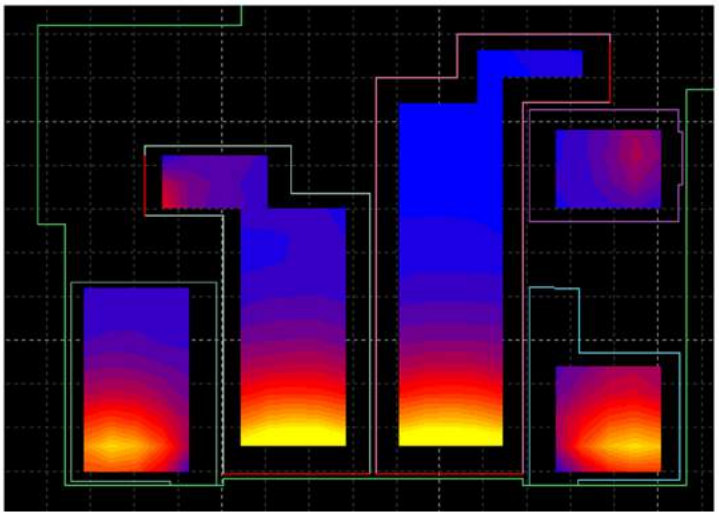


Figure 4: An example of computer simulation used to evaluate the impact of sun-shading devices on daylighting (view 2)


**Reference:**

[1] Selangor Uniform Building (Amendment) (No. 2) By-Laws 2012

[2] Department of Standards Malaysia (2014) MS 1525: 2014 Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings (2nd Rev.). (2014) Department of Standards Malaysia: SIRIM.





Author:

**Dr Joseph Kong**

*DME Solutions Sdn Bhd*


Dr Joseph Kong holds a Doctorate Degree in Sustainable Design. He has published a number of articles and conference papers, outlining passive design strategies for buildings in tropical countries. He is currently the Director of DME Solutions Sdn. Bhd. He oversees all the green building/township consultancy projects in the Company. For more information, kindly visit webpage https://dmesolutions.com.my/

# Is our indoor lighting supporting our wellbeing or harming us slowly?

By: Ar Dr RatnaKala Sithravel (the Architectural Network)

## Introduction

Electric lighting is an integral part of the built environment. For most of us, it is our main light source throughout the day and in any weather condition. In Malaysia, it is designed based on requirements recommended by MS 1525:2019, Panduan Teknik JKR or IES Standards to provide adequate lighting for us to see and perform our tasks comfortably. Some have even opted in energy-efficient lighting for energy conservation and green building rating, while some accentuated the lighting as important architectural features. Indoor lighting appears to be supporting us just the way we need it to be. Thanks to architects, M&E engineers, interior designers, lighting specialist and manufacturers who collaboratively work to calculate appropriate, code-compliant lighting levels using sophisticated lighting software and recommending fixtures that go well with the client's brief and budget. If you think indoor lighting is merely brightness and colour for functionality, visual comfort and aesthetics, you have certainly missed something important.

## Crux of the matter

The electromagnetic radiation of light offers scientific ingredients to impact both our visual and non-visual responses. Apart from supporting our visual system, the complex characteristics of light regulate and entrain our circadian rhythm. Circadian rhythm is the 24-hour cycle of our biological functions regulated by our biological clock. Much like the food we eat, indoor lighting affects our non-visual responses like mood, alertness, sleep-wake behaviour and even the levels of melatonin hormone. Melatonin is a sleep-promoting hormone that is produced with the onset of darkness to induce sleep at night. All these effects are orchestrated by five key factors within the indoor lighting design parameters, namely, Intensity, Spectrum, Timing, Duration and Spatial distribution.

### Intensity

The Malaysian (MS 1525:2019) and European (EN 12464-1) lighting standards recommend an average horizontal illuminance ($E_H$) of 300 to 500 lux regular lighting condition for general office. However, research agencies in World Health Organization have emphasised that our indoor lighting levels which are mainly less than 500 lux in workplace are biologically dim during the day and too bright at night when compared to the natural daylight and moonlight levels. These two exact opposite environmental lighting scenarios are desynchronising our circadian rhythm [1]. Professor Mariana Figueiro, director of the Lighting Research Center (LRC) in New York, describes such a state as *"Experiencing jet lag all the time when your biological clock is out of sync with your watch"*. So, what $E_H$ levels are circadian effective? Numerous studies evidenced daytime exposure to bright light (1,000 to 5,000 lux) is better in supporting the non-visual responses than dim light (less than 500 lux). Gou and colleagues from China [2] found incorporating higher $E_H$ levels (approximately 980 to 1,100 lux) improved daytime alertness, visual performance and was still within visual comfort limits. Besides enhancing motivation and concentration, bright light also helps to lower the melatonin levels in the morning, so that, in a rebound response its levels are higher at night, thus improving sleep quality [3]. Next, how do we design circadian effective $E_H$ levels

during preoccupancy design stage? A free, online tool called the Circadian Stimulus (CS) metric developed by Rea and Figueiro from LRC [4] is recommended to estimate the extent a user-defined light source could suppress melatonin. Figueiro recommends indoor lighting that delivers CS value of at least 0.3 in the morning and CS value of less than 0.1 in the evening to promote circadian entrainment.

## Spectrum

It comprises of the following characteristics:

### (a) Wavelength:

Light is a small part of the electromagnetic spectrum with wavelengths ranging from 380 to 780 nm, which is sandwiched between the ultraviolet (UV) and infra-red (IR) rays (see Figure 1). The wavelength increases from violet to blue, green to yellow, and orange to red. Our visual system is maximally sensitive to light in the green-yellow wavelength range, while our biological function is in the blue wavelength range.

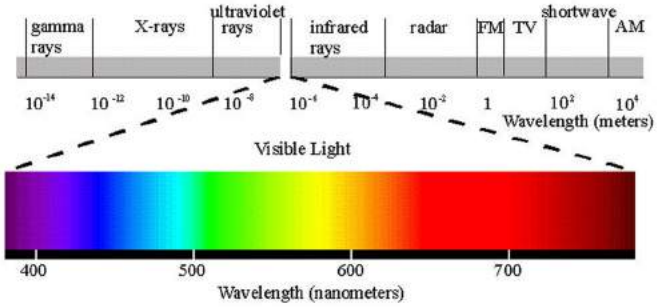



Figure 1: Indicative location of light in the electromagnetic spectrum
*(Source: http://solar-center.stanford.edu/SID/activities/GreenSun.html)*

### (b) Correlated colour temperature:

CCT refers to the different classifications of white light in unit Kelvin (K). Commercially available lamps have CCT ranging from 2,700 K warm white (WW) to 4,000 K cool white (CW) and 6,500 K cool daylight, depending on the manufacturer's specifications (see Table 1). CCT requirements for wellbeing would need to consider:

(i) Time-of-the-day effects for circadian entrainment.
- Cooler lighting (CW/Daylight) is needed during daytime to boost alertness.
- Warmer lighting (WW) is needed during the evening and night to promote relaxation and healthy sleep pattern.

(ii) Socio-cultural differences in terms of visual preference and comfort [5,6].
- Individuals from the West and cooler climate regions (Europeans, North Americans) are likely to prefer lower CCT (3,500 to 4,000 K) ambience.
- Individuals from the East (Asians like Japanese, Malaysians, Indonesians) and sub-tropical regions are likely to prefer higher CCT (5,000 to 6,500 K) ambience.

### (c) Spectral power distribution:

SPD depends on the type of lamp and its CCT. Figure 2 presents the relative SPD of different light sources. It is beneficial to incorporate CW/Daylight LED lamps in spaces with minimal or no natural daylight. Its spectral properties (peak at short wavelengths) provide a bluish colour ambience that helps to supplement the missing bluish tinge of natural daylight. Such an approach supports wellbeing during daytime, but at night it could be contributing towards blue-light hazard. Hence, it is recommended to integrate different types of lamps based on the functions and timing of the light's usage.

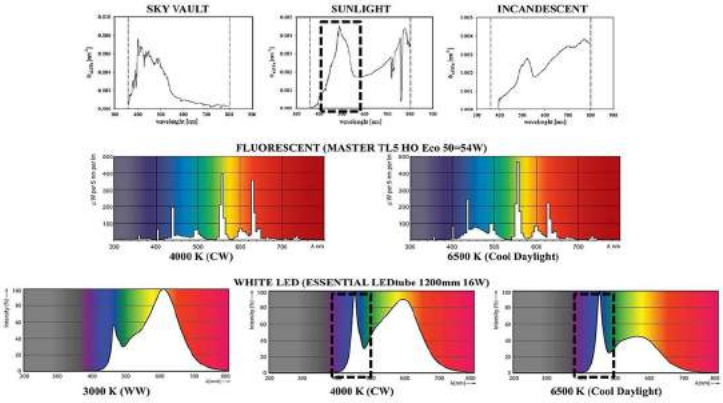



Figure 2: Relative SPD of the different light sources. Black dashed line indicates LED lamps in higher CCT imitating natural daylight's peak at short (blue) wavelengths range.
*(Source: www.lighting.philips.com.my)*

## Timing

Our current standards recommend regular lighting throughout the day. Such lighting may be appropriate for our visual responses; however, our non-visual responses require different lighting conditions from morning till night. Exposure to bright light or higher CCT light in the morning acts as a powerful stimulus to re-entrain a disrupted circadian rhythm. Yet, at night, bright light or higher CCT light (even in low

Table 1: Indicative CCT categorisation of commercially available lamps

| CCT category | Warm White (WW) | Cool White (CW) | Cool Daylight |
|---|---|---|---|
| CCT range | less than 3,000 K | 4,000 to 5,500 K | higher than 6,000 K |
| CCT range for visual appraisal *(Source: greensystemsled.com)* |  | | |
| Characteristics *(Sources: [6,7])* | Lower CCT:<br>• Has higher proportion of longer (red) wavelengths.<br>• Yellowish colour appearance.<br>• Suitable for creating dim ambience that resembles sunset and cosy, relaxing setting. | Higher CCT:<br>• Has higher proportion of shorter (blue) wavelengths.<br>• Neutral-white (CW) to bluish-white (Daylight) colour appearance.<br>• Suitable for creating bright ambience that resembles natural daylight and business-like setting. | |

illuminance of 40 lux at eye level [8]) can significantly suppress melatonin hormone, consequently delaying one's regular sleep-wake timing and reducing alertness and work performance the following day.

## Duration

It takes split seconds for light to trigger our visual system. Nevertheless, it takes 1 to 2 hour(s) for light to significantly influence our non-visual responses during daytime and approximately 15 minutes to 1 hour at night. Just like adding salt for taste, we need optimal duration of specific light exposures.

## Spatial distribution

The angle in which light hits our photoreceptors (light sensors) in the retina influences the magnitude of impact in our non-visual responses. Light incident on the lower part of the retina (light received from above, e.g. skylight) has more sensitivity towards circadian regulation and melatonin suppression, compared to light incident on the upper part of the retina (light received from below). It is recommended to design horizontal and vertical illuminating surfaces to boosts retinal illuminance, i.e. by incorporating overhead luminous ceiling (consisting of general and suspended lighting) and LED wall panels at eye level.

## Conclusion

Now that we know how each factor influences our wellbeing, we have to judge for ourselves whether our indoor lighting is supportive of our wellbeing or harming us slowly by desynchronising our circadian rhythm. Based on current practise, we may not realise the latter may be true. In order to promote circadian entrainment and minimise circadian disruption, lighting and medical research have integrated the five factors and developed a variety of human-centric dynamic lighting. The interventions include timely exposure to changing $E_H$ and CCT to achieve energising and calming effects during work period in workplace with less natural daylight [9]. Despite being at its infancy stage, studies from Europe have evidenced dynamic lighting improves alertness, concentration, satisfaction and productivity during winter. Interestingly, a Malaysian study by Sithravel and colleagues discovered dynamic lighting characteristics for the tropics deferred from the recommendations benchmarked based on seasonal climate data [10]. More local multidisciplinary research is encouraged to develop the dynamic lighting solution for our wellbeing in the tropics. There are possibilities that lighting solutions developed based on seasonal climate data may not

necessarily be applicable in the tropics due to genetic, geographical location, climate and cultural differences [11].

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Ar. Dr. RatnaKala is an architect, passionate about Lighting for Wellbeing and Healthy Buildings. She is attached to the Architectural Network and the University of Malaya. Ratna pursued her PhD in Architectural Studies with Universiti Putra Malaysia as she was enthusiastic about finding scientific solutions to design healthier buildings for users' wellbeing. Ratna's multidisciplinary research integrated the architectural and medical teams and developed a ground-breaking architectural lighting design solution for human wellbeing in the tropics. It enhanced individuals' morning wellbeing and productivity 50% more efficiently than the standard lighting in a windowless workplace setting. She has published her discoveries in top-ranked peer-reviewed journals from the USA and UK and presented her works to International lighting companies (Philips, Zumtobel, Bartenbach).

# Ventilation and Indoor Air Quality:

## A Green Building Perspective

By: Ir Ashwin Thurairajah

### Introduction

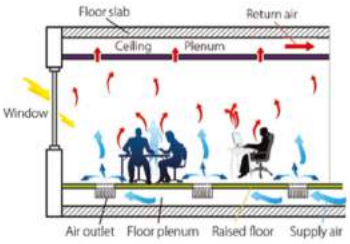
The on-going Covid-19 pandemic has renewed focus on the importance of good ventilation and indoor air quality. Apart from the primary transmission medium of physical contact with an infected person, the novel SARS-Cov-2 virus is also spread through droplets than contaminate the surrounding surfaces and air in the immediate surrounding of its source [1]. As most people in the world spend close to 90% of their time indoors, poor indoor air quality through exposure to air contaminants has a direct influence on a person's immune system. Diluting, filtering and removing viruses, bacteria and other pollutants is of primary concern to engineers when designing our indoor environment to ensure good ventilation which directly correlates to better indoor air quality.

### What is good ventilation?

Ventilation is the process of delivering outdoor air into a building or room and distributing that air within the room [2]. The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) have developed a standard for appropriate ventilation defining minimum ventilation rates and other measures to improve indoor air quality which has been incorporated into voluntary Malaysian Standards relevant to commercial and residential buildings (i.e MS 1525 and MS 2680) [3],[4]. Infiltration is the uncontrolled entry of outdoor air into a space and is referred to as adventitious ventilation. Apart from improving air quality, ventilation is used to control temperature, humidity and air motion to benefit the thermal comfort of a space.

Two (2) important design parameters to consider is the number of times the volume of air within a defined space is replaced (i.e cycles of supply and return/extract) referred to as air changes per hour (ACH) and how well this air is distributed across the breathing zone referred to as air change effectiveness (ACE) [5].

ACH recommendations are based on the floor area of space, number of occupants and functionality of the space. Typical values range from 5-6 for bedrooms to 15-30 for kitchen and restrooms. ACE is a dimensionless quantity between 0-1 and is determined through computer simulation to show how well air is mixed within the space – 1 denoting perfect mixing of air. The concepts are best illustrated in Figures 1 and 2 below.



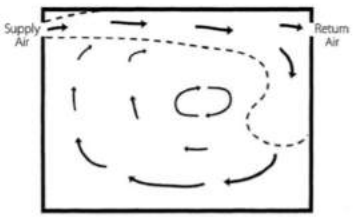




Figure 1 (left): Depicting displacement flow in the breathing zone which results in good mixing of air.
Figure 2 (right): Entrainment flow which can result in some short circuiting of supply air to the return side. The rate of air volume changes will be dependent on space function.

*(Source : ASHRAE 62.1:2019)*

### What is good indoor air quality?

Our sense of smell is not a sufficient barometer to assess the quality of air we breathe as there are countless microparticle pollutants in the built environment that can cause long term health effects. These include bacteria from mould growth, environmental tobacco smoke from burning tobacco products, chemicals such as formaldehyde from furnishings and volatile organic compounds from the application of solvents. In Malaysia, the Industry Code of Practice on Indoor Air Quality 2010 [6] lays out the parameters that constitute good indoor air quality.

The limits on pollutants provided by these guidelines serve as a good baseline for both working and living spaces as per Figure 3 below.

| Indoor Air Contaminants | Acceptable limits | | |
|---|---|---|---|
| | ppm | mg/m3 | cfu/m3 |
| Chemical contaminants | | | |
| (a) Carbon monoxide | 10 | - | - |
| (b) Formaldehyde | 0.1 | - | - |
| (c) Ozone | 0.05 | - | - |
| (d) Respirable particulates | - | 0.15 | - |
| (e) Total volatile organic compounds (TVOC) | 3 | - | - |
| Biological contaminants | | | |
| (a) Total bacterial counts | - | - | 500* |
| (b) Total fungal counts | - | - | 1000* |
| Ventilation performance indicator | | | |
| (a) Carbon dioxide | C1000 | - | - |

Figure 3: Ppm is the parts of vapour or gas per million part of contaminated air; mg/m3 is milligrams per cubic meter of air at 25°C and 1atm pressure; Cfu/m3 is colony forming units per cubic meter.
*(Source: Department of Safety and Health (DOSH), Malaysia)*

## How do green buildings achieve superior ventilation and indoor air quality?

Green building design encourages a holistic approach to improving the quality of the indoor environment through ventilation [7]. Early stage planning can result in ventilation solutions for various building types that result in lower operating costs whilst prioritizing the health and wellbeing of its occupants. Basic ventilation and indoor air quality improvement strategies mandated by green building certification standards are highlighted as follows:

### *Mechanical Ventilation*

Mechanical ventilation refers to supply and extract fans for centralized air-conditioning systems as well as forced air circulation system such as ceiling fans. All fans utilized are to be high efficiency rated with low power consumption.

For centralized air-conditioning systems, projects are required to perform ventilation system sizing to comply with ASHRAE guidelines. Further, computational fluid dynamics (CFD) modelling is encouraged to prove air change effectiveness in the breathing zone. Humidity is to be kept in the range of 40-70% to discourage mould growth. Fresh air needs to be continually brought in at a suitable rate to ensure dilution of contaminants and to limit the build-up of carbon dioxide. Demand controlled ventilation whereby carbon dioxide sensors are placed in the fresh air intake is an energy efficient solution to maintain air quality during periods of low occupancy.

### *Natural Ventilation*

Harnessing natural ventilation is an optimal solution to balancing the competing demands of energy usage, thermal comfort and improved air quality. There are two (2) methods for providing natural ventilation namely cross ventilation (wind driven) and stack ventilation (buoyancy driven).

In Malaysia, the prevailing winds come from two predominant directions; that is the north-east during the Northeast monsoon and south to south-east during the Southwest monsoon. Green buildings are designed with window openings facing the north and south directions to take advantage of prevailing winds. Further, to harness sufficient pressure differences to promote ventilation through a space, window openings are kept similar in size and not more than 12m apart.

Stack ventilation can be exploited by introducing louvres or openings at roof level to permit movement of air due to pressure differences formed by temperature gradients in the building space.

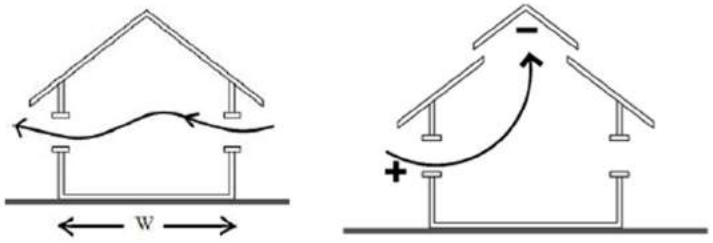



Figure 4: Illustrates cross ventilation with similar sized window opening spaced 12m apart. Figure 5 (right) illustrates stack ventilation with buoyancy driven air movement.
*(Source: MS 2680:2017)*

### *Limiting pollutants*

Green buildings seek to minimize the source of contaminants at the onset of building construction. Strategies include use of low volatile organic compounds (VOC) products for all internal surfaces such as paints, carpeting and adhesives. Use of low formaldehyde wood products and insulation is also encouraged. Prior to handover of finished building, contractors are required to perform proper ventilation induced flushing of indoor space to dilute the space of contaminants.

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### *Air filtration*

Air pollution is common in many urban environments necessitating filtering of outdoor air prior to entry into a space. This is particularly important in sealed buildings where air-conditioning use is the predominant cooling mechanism. Typical metrics to measure the effectiveness of filters in stopping contaminants are the minimum efficiency reporting value (MERV) and high efficiency particulate air (HEPA) scales. MERV 12 grade filters can stop particles down to 1 micrometre. An appropriate filter cleaning schedule is important to prevent clogging that can affect the performance of cooling system. Where natural ventilation is employed, air purifiers are encouraged in locations whereby persistently heavy particulate pollution is encountered.

## Summary

Air is the elixir of life. Unfortunately, a large majority of Malaysians are exposed to air of poor quality in our working and living environments daily. Further, we need to anticipate the onset of more viral pandemics that accelerate its spread in poorly ventilated spaces. Let's seek better indoor air quality design and management for a healthier and more prosperous future.



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Ir. Ashwin Thurairajah is a Professional Engineer and has more than 14 years of experience in engineering spanning building services, oil and gas and sustainable development. He speaks frequently in workshops/seminars on the topics of green development and low carbon design. He has contributed to research papers pertaining to distributed generation and renewable energy solutions for residential applications.

# INDOOR AIR QUALITY

# In the New Normal

By: Michael Folk (Airestec Sdn Bhd)

According to the Department of Occupational Health and Safety (DOSH), "Indoor air quality describes how inside air can affect a person's health, comfort, and ability to work. It can include but is not limited to temperature, humidity, mould, bacteria, poor ventilation, or exposure to other chemicals". As per the United States Environmental Protection Agency (EPA), IAQ can be at least 2 to 5 times worse than outdoor air quality, and in some cases, it can be even up to 10 times worse!

## Consequences of Poor IAQ

Some of the short term effects of poor IAQ include irritation of the eyes, nose and throat, headaches, dizziness, fatigue, allergy and asthma. Generally, it can lead to discomfort, ill health, absenteeism and lower productivity. Certain immediate effects are similar to those from colds and other infectious diseases that are transmitted through the air, and "sick building syndrome" symptoms due to elevated indoor pollutant levels. Some effects may be further aggravated by inadequate ventilation or humid conditions indoors.Other long-term health effects that may show up after years of exposure to poor IAQ include respiratory diseases, heart disease, lung cancer, carbon monoxide poisoning and Legionnaires' Disease.

## Sources of Indoor Air Pollution

Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the area. High temperature and humidity levels can also increase concentrations of some pollutants.

There are many sources of indoor air pollution including kitchen stoves, tobacco, building materials and furnishings, household cleaning and maintenance products, and personal care, air-conditioners and humidifiers, excess moisture, radon, pesticides, formaldehydes, Volatile Organic Compounds (V.O.C.) and outdoor air pollution.

## Enter COVID

Based on the above effects of poor IAQ, it can already be seen that "flu-like" symptoms can be caused by the existing pollutants in the air including mould spores and dust, in part due to contaminated air-conditioner cooling coils as a result of humidity. Poor IAQ leads to lower immunity, making people susceptible to being infected by viruses.

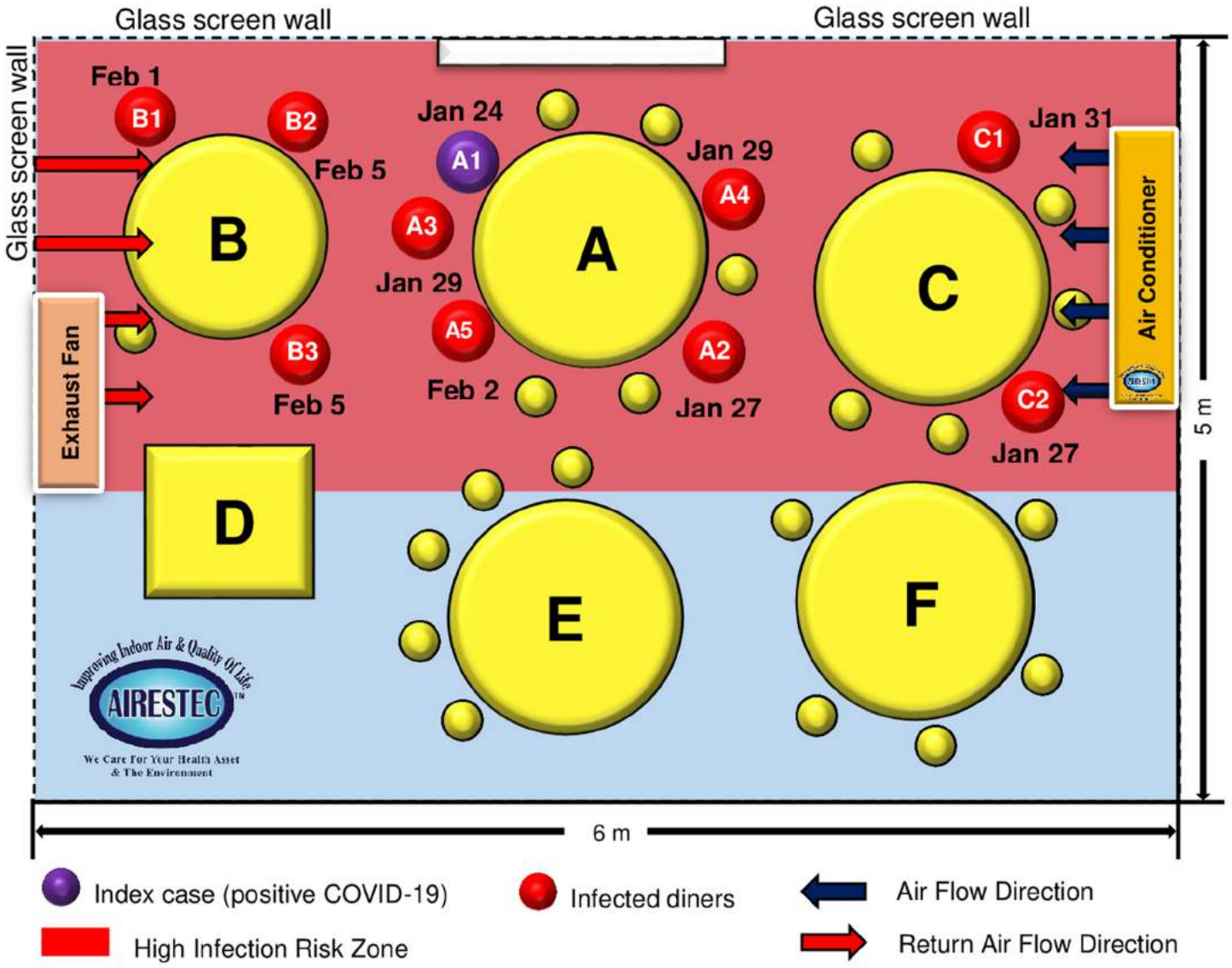
During the Movement Control Order (MCO) isolation period, many buildings have been left unoccupied and unattended, resulting in higher humidity which in some places have led to mould contamination. They will need to be decontaminated before being occupied again or else the "Sick Building Syndrome" will cause people to have lower immunity. Places with water retention like cooling towers, leaky air-conditioners and water dispensers may be at risk of Legionnaires' Disease, another deadly respiratory disease.

Infectious diseases like the COVID-19 can also be spread by the air-conditioner air flow as was seen in a recent article published in the Emerging Infectious Diseases Journal for US Centres for Disease Control and Prevention (CDC), largely due to poor air

ventilation. Although this setting was at a restaurant, it is applicable to any air-conditioned environment including offices, schools, malls and factories.

## The correlation of virus spread via the air-conditoner at a restaurant in Guangzhou, China

How a restaurant air-conditioning unit caused nine diners to be infected with COVID-19 from January 25 to February 5.




The gap between asymptomatic index case A1 and other people at different tables exceeded one metre. However, the research said that strong airflow from the air-conditioner may have spread the floating droplets from table A to table B, then back to table A again and to table C, causing diners A2, A3, A4, A5, B1, B2, B3, C1 and C2 to be infected despite social distancing. Contaminated air is often circulated in an indoor environment as ventilation is insufficient. The highlighted area illustrates the potentially higher risk of infection zone.

*(Credit: Letter of Research by a group of scientists in Guangzhou, China published in the Emerging Infectious Diseases Journal based at the US Centers for Disease Control and Prevention.)*

HVAC/Air-Conditioning System, provide an environment where biofilms, which are food source for bacteria, fungal & mould, will proliferate and continue to grow and expand uncontrollably in any aqueous environments.

Contamination will circulate through the system several hundred times a day with increased airborne contamination and associated risk, which can cause a range of health issues including fever, flu, respiratory /lung infection, asthma, fatigue, throat irritation, difficulty in concentration, food and beverage contamination, cosmetic and pharmaceutical product defects. These will compromise the immune system, where other forces such as VIRUSES (possibly even COVID-19) may attack. It is important that housekeeping and cleanliness be maintained. "Decontamination & Treatment" has to be placed as the highest priority as a "New Normal"

A swab test of the air-conditioners at the GreenRE office in Wisma REHDA last year also showed evidence that the bacterial count was considerably high despite the fact that the office was sparsely occupied and 'fairly clean'.

Many air-conditioned buildings in Malaysia have insufficient ventilation, resulting in poor IAQ. Airborne virus droplets spread through air movement can get sucked into air-conditioning systems while being circulated and it can then be recirculated again. Central air-conditioning systems may even spread the virus further. The biofilms in the air-conditioner cooling coils could possibly even "host" viruses such as the COVID-19 (yet to be researched). It is advisable to decontaminate air-conditioners regularly to reduce these risks. When the air-conditioner has been decontaminated, it will also lead to improved efficiency in its performance, resulting in lower humidity, better IAQ and immunity, provided the decontamination does not deteriorate its condition, typically due to the use of corrosive, unhealthy chemicals. Obviously, there are good alternatives to the "normal practice" and perhaps it is time that the "new normal" also includes eco-friendly solutions.

Good ventilation is also a must so there has to be sufficient outlets that can release the stale indoor air and bring in "fresh" outside air. Unfortunately, there is a "cost" to allowing more outside air in as more energy will be consumed in order to cool the air.

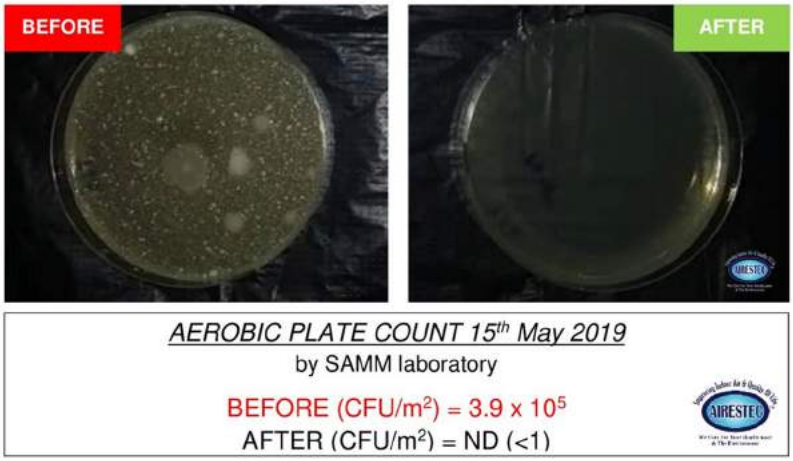



Figure 2: A swab test was done on the ceiling cassette air-conditioner cooling coil before a decontamination on 15th May 2019 and immediately after the decontamination on the same day by Airestec Sdn Bhd. The results showed that the bacterial count was very high at 39,000 CFU/m$^2$ before the decontamination and 99.99% eliminated after the decontamination when there was not a single count of bacteria that could be detected. The testing was conducted by an accreditted SAMM laboratory.

"Decontamination & Treatment" has to be placed as the highest priority as a "New Normal"

## The Green Lesson

This pandemic should have made people realise that in the "new normal", they should practice green and eco-friendly ways of doing things and protect the environment or else Mother Nature may strike back with another pandemic! IAQ will naturally improve if this is done as there is a "cause to every effect" just as there is a "cost for every lesson learnt". Indeed it will be a pity if we continue with the "old normal" ways of polluting. Let us all ensure that certified "Green Buildings" use only certified Bio, Eco and Green products and services as a practice and hopefully it will be made a requirement for any renewal of Green Building Certifications for a truly greener future.

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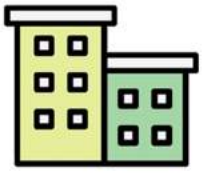
The author, Michael Folk, is on a "Green Mission to Enhance Human Health, Improve Quality of Life and Save the Environment". He takes care of Projects and Business Development at Airestec, a life and environmental sciences biotech group with 30 years of pioneering multi-enzyme technology. He speaks at seminars on green and sustainability matters especially relating to HVAC decontamination, IAQ and environment. He has contributed to a research paper on the "use of enzymes to remove biofilms and improve air flow, system and energy efficiency and prolong equipment life of air-conditioning systems."

# Facts about Indoor Air Quality IAQ 101



### What is IAQ?

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants.

### Effects on Health

Poor IAQ can lead to irritation of the ENT, headaches, dizziness & fatigue. Years of exposure can lead to respiratory diseases, heart diseases and cancer. 1/6 allergy sufferers can tie their symptoms to fungi, bacteria and dust in HVAC systems.

### Pollutant Sources

Sources of indoor pollution include tobacco products, building materials, cleaning supplies, HVAC system and more. Indoor air can be 50% more polluted than outdoor air.

### Productivity and Work Performance

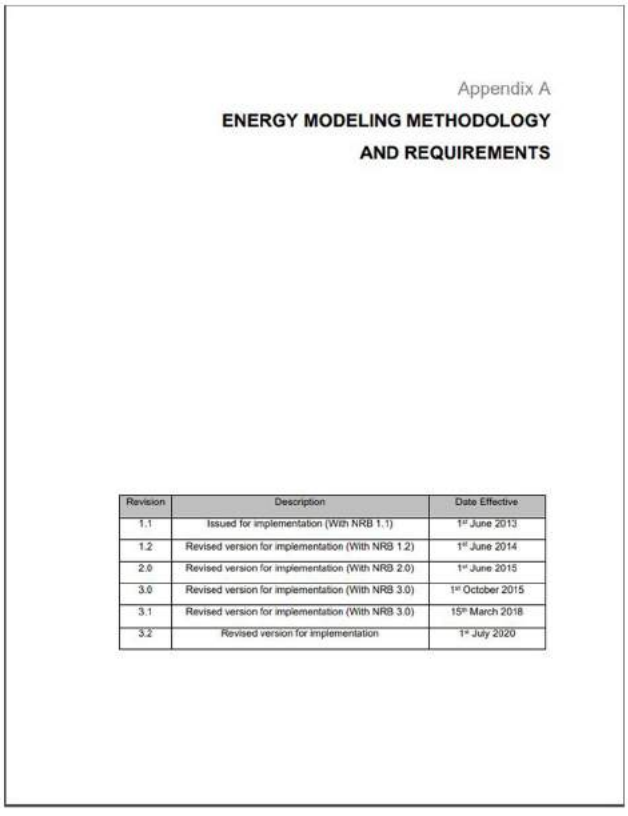
Improvements of the indoor air quality in offices and class rooms can increase productivity and work performance by 10%.
2x cognitive performance in purified than non purified work setting.

# GREENRE TOOLKIT UPDATES

## GreenRE Energy Modelling Guidelines
***Updates***

GreenRE's energy modelling guidelines has been updated to incorporate the requirements of MS 1525:2019. Further, capping limits for various energy systems and devices including renewable energy have been introduced. Energy savings through design changes to incorporate natural ventilation will also be considered for specific cases.

The guidelines is downloadable from our website www.greenre.org.


Appendix A

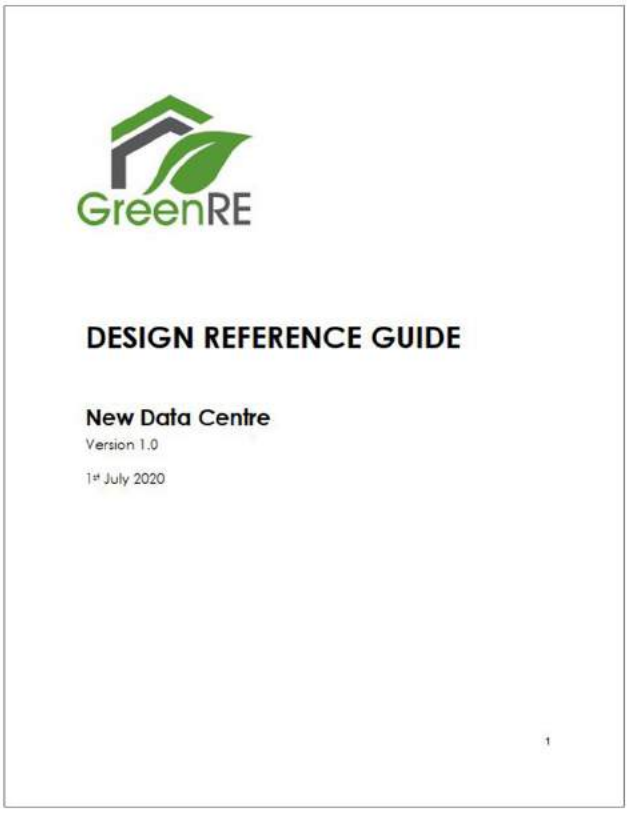
ENERGY MODELING METHODOLOGY AND REQUIREMENTS

| Revision | Description | Date Effective |
|---|---|---|
| 1.1 | Issued for implementation (With NRB 1.1) | 1st June 2013 |
| 1.2 | Revised version for implementation (With NRB 1.2) | 1st June 2014 |
| 2.0 | Revised version for implementation (With NRB 2.0) | 1st June 2015 |
| 3.0 | Revised version for implementation (With NRB 3.0) | 1st October 2015 |
| 3.1 | Revised version for implementation (With NRB 3.0) | 15th March 2018 |
| 3.2 | Revised version for implementation | 1st July 2020 |

## GreenRE Design Reference Guide
***New Data Centre Version 1.0 (NDC v1.0)***

With the exponential growth of the Internet, demand for new data centres is accelerating. The power consumption of these data centres is under increased scrutiny due to greater environmental awareness. It is imperative that these data centres are designed sustainably and GreenRE is proud to introduce the pilot version of our New Data Centre (NDC) standard to address this need. This standard covers six (6) major pillars namely Energy Efficiency, Water Efficiency, Sustainable Construction & Management, Indoor Environment Quality, Innovation and Carbon Emission Calculation. The NDC standard has been developed in alignment to MCMC's green data centre guidelines.

The tool is downloadable from our website www.greenre.org.


GreenRE

DESIGN REFERENCE GUIDE

New Data Centre

Version 1.0

1st July 2020

1

# PROPERTY INDUSTRY SURVEY2H 2019 & MARKET OUTLOOK 2020

A Green building (GB) section was included in REHDA's recent Annual Property Industry Survey to understand how key stakeholders, REHDA members, perceive green buildings, with the objective to identify the benefits, challenges and key issues of green buildings uptake in Malaysia.

## Methodology

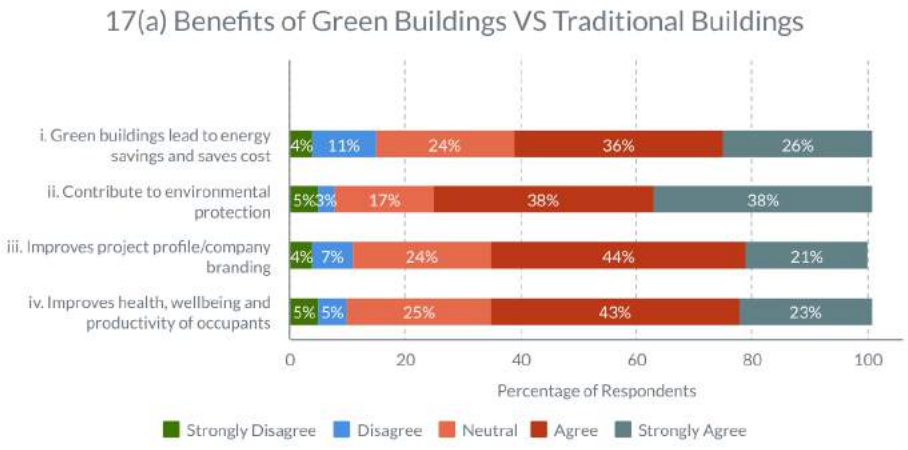
The Survey was conducted on REHDA members in Peninsular Malaysia from 17th January 2020 to 17th February 2020. Survey forms were sent out via Online Survey Monkey and as well as fax and emails to REHDA members. A total of 133 responses were received.

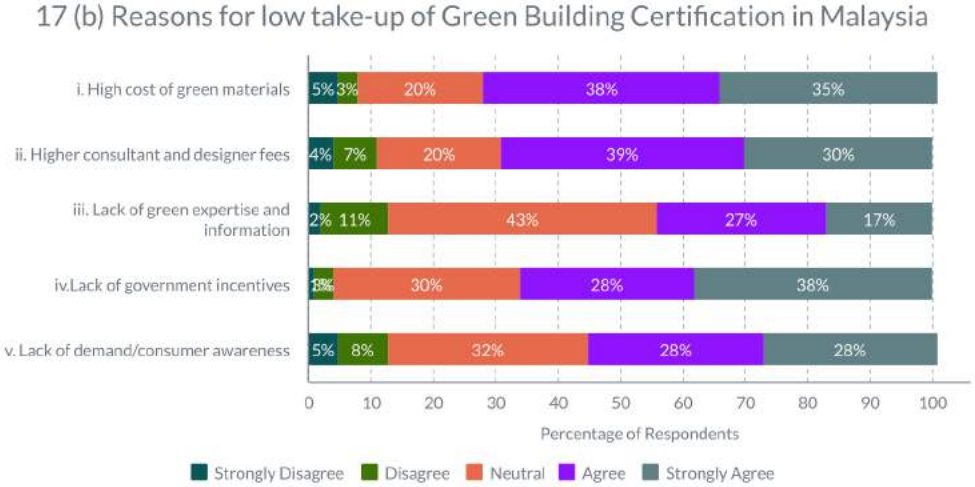
## Key Findings

In Part A, it was found that over 60% of respondents recognise and acknowledge the benefits of green buildings compared to traditional buildings. Benefits ranked according to survey results includes: environmental protection, health and well-being of occupants, company/project branding and energy and cost savings.

Part B, explored reasons for the low take-take up of Green Building Certification in Malaysia. Based on the survey results it can be inferred that main reasons for this are, high cost of green materials, high consultant fees and lack of government incentives. Over 50% of the respondents also agreed that lack of demand and consumer awareness is a factor.

General comments provided by respondents reinstate findings that the incentives and government support was crucial to drive the green industry forward.



# My Green Journey with REHDA

After 6 years of being in the Solar PV world, I wanted to further explore ways I could be part of Malaysia's journey towards sustainability. My flow or mojo has always been inspired at my work place in Antah Group. We are a holding company that owns 50 Companies all around Malaysia, with a diverse portfolio such as mining, advertising, development, palm oil, medical, fintech and the list goes on. Antah Renewables which I am a part of was created after selling the Jimah Powerplant, as we were turning a new page on our mission towards sustainability.

With the spirit of our new group policy, my team and I started solarising within the Group, in our factories, schools, office blocks and much more. We have experience with solar incentives, financing and leasing options by SEDA, ST & Ministry of Energy.

After some years focusing on solar, I wanted to explore other aspects of green technology out there, and this is when I meet GreenRE staff at IGEM2018. I was intrigued about their Greenre Manager's course, which I immediately signed up for after being convinced by Ir Ashwin, COO of GreenRE. Don't get me wrong I did compare their certification with their competitors like CIDB & GBI (Green Building Index) but I felt at home in GreenRE and REHDA.

As I was attending the 3-day course, I was very impressed with the REHDA HQ building (Wisma REHDA). As I walked into the building, it felt very cool despite only utilizing natural ventilation and water features at the entrance of the building. The ceiling was very high and the indoor air circulation was impressive - with a huge fan spinning above the main atrium. These features kept the building cool. As I walked to the washrooms, the corridor lights would turn on and off by themselves, I figured it was an energy saving fixture, my eyes lit up and I thought they were sure to have solar as well and yes, as predicted, they had a 21kWp solar system installed.

After completing the GreenRE Manager Course 17th Intake, and passing the examination on my third attempt, I obtained my GreenRE Manager accreditation. I was ecstatic to pass on my third try, it was tough for a person with a business background to go through an engineering-centric course, also, I had not sat for examinations since my university days in Helsinki.

Later in the year, I was very happy to hear that REHDA had invited me to pitch for the extension of their Solar PV System. I took the bid seriously and I wanted to show the REHDA community that Antah Solar Sdn Bhd are serious players. Focusing on the best price & quality we submitted a competitive proposal and hoped for the best.

To my delightful surprise Antah Solar's bid won the job! Solar PV has been around for a while now, but as years go by, the panels are getting more efficient and the inverters are increasing in kW capacity. That is what we have provided REHDA, the latest technology at an affordable price.

I would like to just conclude this article to convey my gratitude to REHDA for a lovely Green Journey from Beginning to the end, SOLAR ON EVERYONE.

**YM Tunku Akmaludin Zakri b. Tunku Dato' Zuhri**
*Business Development, Sales and Marketing Associate.*
*18 years' experience in Business Development, Project Management & Marketing.*
*Educated in Helsinki School Economics Business Administration Helsinki,Finland.*
*Vice President of MPIA Malaysian Photovoltaic Industry Association- Portfolio Publications.*

# CONGRATULATIONS

## New GreenRE Managers (GREMs)

| Cert No | Name | Company |
|---|---|---|
| GREM0236 | LEE YENG YANG | VOLTZ ENGINEERING SDN BHD |
| GREM0237 | YOGARATINAM A/L SELVARATANAM | JOHNSON CONTROLS (M) SDN BHD |
| GREM0238 | LAI CHOR YIN | RDC ARKITEK SDN BHD |
| GREM0239 | S. KANESA VATHANAN | PERUNDING SHANU SDN BHD |
| GREM0240 | MUZAFFAR MAZLAN | CHEVRON MALAYSIA LIMITED |
| GREM0241 | SERI RAMLOO RAMALOO | SERI ALAM PROPERTIES SDN BHD |
| GREM0242 | MUHAMMAD YUSUF BIN JAAFAR | RESIDENSI PANDANMAS 2 |
| GREM0243 | Ar. TEE KHAY MEE | KM TEE ARCHITECT |
| GREM0244 | CHEONG YUN KIM | |
| GREM0245 | SHARIDA ABD WAHAB | CHEVRON MALAYSIA LIMITED |
| GREM0246 | MOHD ZAMREE TOMY | |
| GREM0247 | FU YONG WOOI | BFG CONSULTING SDN BHD |
| GREM0248 | LIM JUN WEI | IEN CONSULTANTS SDN BHD |
| GREM0249 | MOHD FADZIL ARIFFIN | SAPURA RESOURCES BERHAD |
| GREM0250 | NG YEE LIN | BSD CONSULTANCY SDN BHD |
| GREM0251 | WONG KHEE VEAI | G&P M&E SDN BHD |

We welcome these newly certified GreenRE Managers (GREM) to our GreenRE community. We look forward to working together towards greening the real estate industry in Malaysia.



## Newly Certified Projects

| Project Name & Location | Company | ESD Consultant | Design Reference | Type of Certification | Date of Certification |
|---|---|---|---|---|---|
| WAO's Child Care Centre, Petaling Jaya, Selangor | Women's Aid Organisation | BSD Consultancy Sdn Bhd | RES v3.0 | Provisional | 13/3/2020 |
| Emporis (Residential), Petaling Jaya, Selangor | Emporis Sdn Bhd | Next Gen Sdn Bhd | RES v3.0 | Provisional | 14/5/2020 |
| Taman Megah Residential, Petaling Jaya, Selangor | PPB Hartabina Sdn Bhd | Li-Zainal Sdn Bhd | RES v3.0 | Provisional | 10/3/2020 |
| Suasana@Damai Residence, Petaling Jaya, Selangor | Medan Prestasi Sdn Bhd | Neapoli Sdn Bhd | RES v.30 | Provisional | 14/4/2020 |
| Sunway Belfield, Kuala Lumpur | Sunway Belfield Sdn Bhd | LJ Energy Sdn Bhd | RES v3.0 | Provisional | 6/5/2020 |
| Parc 3, Kuala Lumpur | Titian Sama Sdn Bhd | LJ Energy Sdn Bhd | RES v3.1 | Provisional | 23/3/2020 |
| Sunway Velocity Two Plot B Kuala Lumpur | Sunway Velocity Two Sdn Bhd | LJ Energy Sdn Bhd | RES v3.1 | Provisional | 29/5/2020 |
| Mc Donald's Drive Thru Restaurant @ Setia Alam | Gerbang Alaf Restaurants Sdn Bhd | ESD Greentech Sdn Bhd | NRB v3.1 (Restaurant) | Actual | 31/1/2020 |
| Thomson Hospital, Petaling Jaya, Selangor | Thomson Hospitals Sdn Bhd | ESD Greentech Sdn Bhd | HC v1.0 | Provisional | 11/6/2020 |
| The Tamarind, Penang | E&O Property (Penang) Sdn Bhd | In House Team | RES v3.0 | Actual | 10/6/2020 |
| Straits Quays Office, Block 6, Penang | WCW Technologies Sdn Bhd | In House Team | NRB v2.0 | Actual | 16/6/2020 |
| EM Hub Stratified Industrial Facilities, Kota Damansara, Petaling Jaya, Selangor | EM HUB Sdn Bhd | ESD Greentech Sdn Bhd | IND v1.0 | Provisional | 3/2/2020 |
| Residensi Riana Dutamas 2, Kuala Lumpur | 368 Segambut Sdn Bhd | Green Quater Sdn Bhd | RES v3.1 | Provisional | 14/5/2020 |
| Tropika Bukit Jalil, Kuala Lumpur | Berjaya Golf Resort Bhd | BSD Consultancy Sdn Bhd | RES v3.1 | Provisional | 24/4/2020 |
| The Mate, Petaling Jaya, Selangor | OCR Land Development Sdn Bhd | DME Solutions Sdn Bhd | RES v3.0 | Provisional | 14/1/2020 |
| NTT CBJ5 Cyberjaya | NTT Msc Sdn Bhd | Green Urban Matters Solutions Sdn Bhd | NRB v3.1 | Provisional | 30/3/2020 |
| Tropicana Miyu (Residensi Tropicana Harapan), Petaling Jaya, Selangor | Tropicana Temokin Sdn Bhd | DME Solutions Sdn Bhd | RES v3.0 | Provisional | 28/4/2020 |
| Court of Chaya (NMP Cremated Remains) Nilai, Negeri Sembilan | Xiao En Memorial Park Bhd | Neapoli Sdn Bhd | NRB v3.1 | Provisional | 4/6/2020 |

PLATINUM

GOLD

SILVER

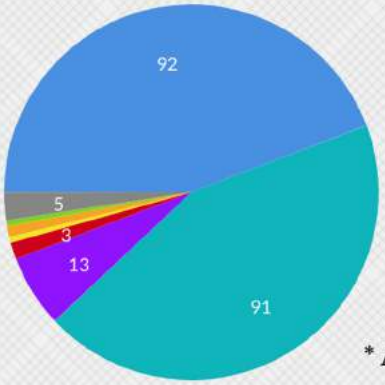
BRONZE

GreenRE applauds these developments for incorporating green principles and applications, contributing towards lowering Malaysia's carbon footprint and the sustainable development agenda!

# Project Statistics

January - June 2020

## Registered Project




- Residential (RES) (44.23%)
- Non-Residential Building (NRB) (43.75%)
- Existing Non-Residential Building (ENRB) (6.25%)
- Healthcare Facilities (HC) (1.44%)
- Industrial Facilities (IND) (0.48%)
- Existing Industrial Facilities (EIND) (0.96%)
- Office Interior (INT) (0.48%)
- Township (TS) (2.4%)

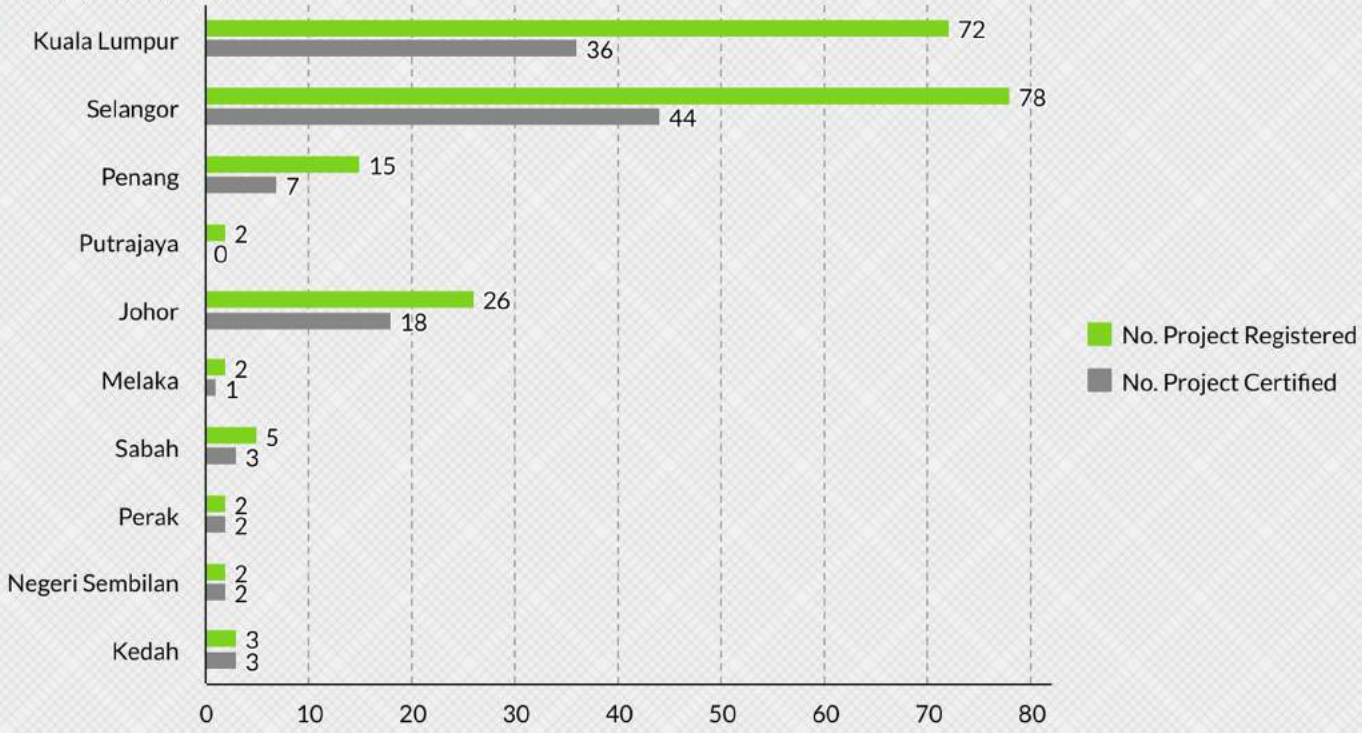
* As per End of June 2020

**208**
Registered Projects

Building
101,114,890.4 sqm

Township
1,976.20 acre

## Project Distribution




## Certified by Rating

**10%**
Residential (RES) 33%
Non-Residential Building (NRB) 67%

**26%**
Residential (RES) 62%
Non-Residential Building (NRB) 32%
Existing Residential Building (ENRB) 3%
Township (TS) 3%

**20%**
Residential (RES) 43%
Non-Residential Building (NRB) 40%
Existing Non-Residential Building (ENRB) 4%
Healthcare Facilities (HC) 4%
Existing Industrial Facilities (EIND) 9%

**44%**
Residential (RES)47%
Non-Residential Building (NRB) 33%
Existing Non-Residential Building (ENRB) 14%
Township (TS) 4%
Industrial Facilities (IND) 2%