TAKING MALAYSIAN CONSTRUCTION TO NEW LEVELS

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VOLUME

2

2017

ELEVATING SUSTAINABLE CONSTRUCTION IN MALAYSIA

PRIME MOVER TAN SRI DATUK SERI LIM KENG CHENG: MAKING INROADS FOR SUSTAINABILITY IN MEGA PROJECTS

CAREERS THE LIFE OF AN ENVIRONMENTAL OFFICER

CITP THRUST 2: ENVIRONMENTAL SUSTAINABILITY

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Sustainable Construction Technologies from Malaysia for the World

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2 HEIGHTS EDITORIAL

Building Sustainably, for Future Generations

ast October. Deputy Prime Minister Datuk Seri Ahmad Zahid Hamidi addressed the United Nations with regards to Malaysia's commitment to sustainable development and construction. But what does that mean to Malaysia as a whole? How will that dedication impact our construction industry? Will it help or hinder development in our country? In this issue of HEIGHTS, we are focusing on environmental sustainability in construction to help our members gain a better understanding of the concept and answers to these questions.

Our world's population is rapidly approaching 7.5 billion people, with Malaysia's population approaching 32 million people. Seventeen short years ago, at the turn of the century, the world's population had just tipped over 6 billion people and Malaysia was home to not quite 24 million people. The world's population has grown by a quarter and Malaysia's population has grown by a third. To be able to feed, house and care for these people, construction is necessary.

In the past, the world has been able to take a less sustainable approach. Humankind's imprint on the planet was less noticeable when there were fewer of us. This rapid growth demands that we give strong consideration to how buildings are constructed, the materials used to create them and the expected efficiency of the finished structure.

When addressing the UN General Assembly, Zahid stated, "Our current five-year development plan, the 11th Malaysia Plan (11MP) covering the period of 2016 to 2020, was formulated with people at the centre of all development efforts and with the theme, 'anchoring growth on people.' The Plan embraces three main principles - achieving high income, inclusiveness, and sustainability. In many aspects, the plan mirrors the multi-dimensional nature of the UN-inspired sustainable development growths." The UN's 2030 Agenda for Sustainable Development and the Sustainable Development Goals commits Malaysia to reducing greenhouse gas emissions intensity of our GDP by up to 45% by 2030.

These are lofty goals that will have a strong impact on the construction industry in Malaysia for years to come. Fortunately, sustainable construction is not a new concept and we have the experience of other organisations and construction firms all over the world to lean on during this change. From new technologies and sustainable materials to powerful analytics and building modelling options, it's easier than ever to plan, develop and construct buildings that fall within these parameters. Superior connectivity is allowing construction and engineering professionals from across the country and around the world to collaborate and develop new products, concepts. and technologies to keep our world and our country moving towards a more sustainable future.

CIDB has a vested interest in improving sustainability in construction in Malaysia. Our country's population is growing more quickly than the rest of the world's rapid rate, demanding a sustainable approach to protect our country's environment and natural resources. We have developed a number of programmes over the years to help construction businesses in Malaysia become more sustainable. Our MyCREST tool helps you determine your carbon impact on the job, while the **MAMPAN** centre provides operational models to develop, promote and implement innovative new sustainable options in our industry.

MAMPAN is positioning Malaysia as a regional leader for sustainable construction in 2017. From 2018 to 2020, we'll increase participation and compliance with sustainable construction practices, while boosting sustainable construction in practise after 2020. This focus is in line with changes happening around the world, as the rapid pace of progress and population allows us to grow while protecting our planet's environment.

Tomorrow's populace will have to live a more sustainable life. Finite resources will demand that new options are made available for how we eat, live and build. **CIDB** is here to help make that happen in Malaysia and around the world.

The Editorial Team

Total Solar Starts Construction of Japan's Miyako Solar Park

With regular rumours of Fukushima's nuclear disaster and potential health and safety concerns still filtering in through the news on occasion, it's not surprising that many Japanese have pushed their government towards renewable energy resources, including solar power. To meet demand for energy in Miyako in Itawe Province, Total Solar has been contracted to build a second solar power plant in the country. Designed to provide 25 megawatts at peak performance, the solar park is anticipated to come online in 2018, providing clean energy for the utility's 8,000 households. Designed to meet strict earthquake requirements, the solar power plant is designed to incorporate over 76,000 highly efficient SunPower solar panels. Total Solar is also stretching its wings to explore the large-scale solar energy production opportunities in Europe and other parts of the world while diversifying its holdings across Total Group, Total Solar and SunPower, the solar panel manufacturer.

GLOBAL NEWS HEIGHTS

JAPAN

GLOBAL NEWS

Quebec Construction Worker's Strike Keeps 175,000 Off the Job

Negotiations between construction companies and Canada's Construction Worker's Alliance have stalled, increasing the likelihood that a back-to-work bill would be introduced to force workers back onto job sites that had been idle. Employers began negotiations by pushing a 0.7% pay increase for the next five years, falling far short of the expected inflation rate of 1.6% and putting workers in a pay cut situation, especially with the current weakness of the Canadian dollar and rising fuel costs. Additional employer negotiating points include changing overtime laws and pay as well as demanding more flexibility for start times. Quebec's Premier Couillard had referenced the strike as causing economic losses of \$45 million (RM142.8 million) per day. Though the union stated that it will obey an emergency back to work bill, they were condemning the action and were committed to working up until the last moments to try to negotiate an agreement.

CANADA



Bechtel, International Construction Firm, at Top of ENR 400 for 19th Year

HEIGHTS GLOBAL NEWS

UNITED STATES

GLOBA

GUAM

NEWS

2017

Engineering News-Record recently released its 2017 Top 400 Contractors list, with Bechtel, an international engineering and construction firm, retaining its place at the top for the 19th year running. Other firms rounding out the top ten include Fluor Corporation, The Turner Corporation, CB&I, AECOM, Kiewit Corporation, Skanska USA, PCL Construction Enterprises, Tutor Perini Corporation and The Whiting-Turner Contracting Company. Though these are the same as last year, the order has been shifted somewhat, with the top ten seeing revenue increases of 6.5% over last year's report, totalling \$366.41 billion (RM1.56 trillion) in revenues. Of this, domestic construction counted for \$322.83 billion (RM1.38 trillion), an increase of 9.7% over last year, while foreign construction took a loss of 12.5%, netting only \$43.58 billion (RM186 billion). This change is attributed to increased domestic infrastructure projects under the Trump administration, with Bechtel leading the pack in foreign revenue.

Core Tech International Beginning Guam DOE Tiyan Warehouse After Delays

In the construction world, waiting a year to amend a contract can seem like forever, causing serious project delays, but Guam's Department of Education saw just that. Originally contracting with Core Tech International for two new warehouses to be built, the department proposed in March 2016 to amend the lease to allow for three new warehouses and surrounding property. The other contributing factor to the delays had to do with a primary water well in the area being taken offline, reducing water pressure in the building to less than is necessary for an occupancy permit. With the well expected to come online later this month, it's anticipated that this issue will also be resolved to everyone's satisfaction. After wading through these delays to get the amendment to the lease approved, the DOE finally decided to abandon the amendment in favour of getting the two warehouses built.

Construction Begins on World's Largest Infrared and Optical Telescope

With the increased interest in space exploration following the slow recovery from the worldwide recession, European Space Observatory's international collaboration is moving forward with the Extremely Large Telescope (ELO) project to be constructed on top of Cerro Armazones, a Chilean peak reaching a height of 3,046 metres. Featuring a mirror 39 metres in diameter, the telescope features several new technologies, including imaging hardware capable of taking 4,000 images at one time, each in a slightly different colour, to provide the most accurate survey of the sky to date and superior spectrographic analysis. It will feature both optical and infrared capabilities, with adaptability built in to allow for turbulence in the atmosphere. This engineering marvel is slated for completion in 2024, with ACe Consortium, a combination of Astaldi, Cimolai and EIE group, receiving the contract for this truly out-of-this-world telescope project valued at 400 million Euro (RM1.9 billion).



Picture Source: ESO/L. Calçada

CHILE

GLOBAL NEWS

THE R. P. LEWIS CO.

Dubai Wasl Hotel Tower Project Contract Won by Arabtec

Construction of a 63-story, 300-metre mixed-use tower being developed by Wasl Asset Management Group has been awarded to Arabtec. The project, valued at 1.46 billion AED (RM1.7 billion), is expected to be completed in 2020 and is located across Sheikh Zayed Road across from the Dubai Mall. It will serve as a location for a Mandarin Oriental hotel and serviced residents and is one of a dozen hotel projects Wasl is developing in the area. Arabtec is crediting the contract win to its strong portfolio of mixed-use structures and will be adding it to its existing portfolio of 22 projects in the area. Part of the push for construction in the area is Expo 2020, which is expected to continue driving construction demand over the next three years, though somewhat slower demand has been linked to lower fuel prices, according to a recent report by Turner & Townsend.

UAE

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PAKISTAN

GLOBAL NEWS

QATAR



Pakistan PSPD Earmarks 15.6 Billion PKR (RM635 Million) for Interior Division

With 38 ongoing development schemes and 23 new schemes coming into the mix, the news from Islamabad suggests continued investment in infrastructure and services. Pakistan's Public Sector Development Programme will be investing 10.675 billion PKR (RM435 million) in ongoing projects and 4.991 billion PKR (RM200 million) in new projects. Among the projects are raising eight new wings to the Frontier Corps Balochistan, constructing a Judicial and Administrative Complex, adding a model prison, creating a facility to serve as barracks, administrative, accommodation and training for the ICT Police Rapid Response Force, as well as accommodations for various Rangers units. There will also be additional investment in security technology, including improving FM radio capability for the Islamabad Traffic Police, the second phase of the Pakistan Fingerprint Identification System, the third phase of the Machine Readable Passport/Visa project and the establishment and construction of a National Forensic Science Agency.

Project Qatar 2017 Focuses on Sustainability, Codes, and Global View

At the 14th International Trade Exhibition, Project Qatar 2017 provided a stronger focus on a wide range of construction concerns, including sustainable construction, global best practices and improving construction codes. The conference facilitated over 230 meetings of regional and global construction business concerns with 516 exhibitors providing a presence. In addition, 33 countries provided official pavilions to help facilitate trade and construction in the area. Speakers at the conference included individuals from the International Codes Council, Kohler Co., the Royal Institution of Chartered Surveyors and Qatar Project Management. George Ayache of IFP Qatar noted, "Qatar's construction sector is keen to address the pertinent issues that affect the sector to ensure that the country adopts global best practices and sustainability trends... Qatar's ambition to be among the leading countries in the world when it comes to infrastructure growth demands that construction is of high quality and on par with international standards."

Hanoi International Forum Draws 200, Focuses on Sustainable Infrastructure

At the International Forum on Sustainable Infrastructure in Hanoi on May 17 and 18, nearly 200 international experts came together to discuss issues related to using natural capital to improve infrastructure. Of the 25 million kilometres of roads being added to our world by 2050, 90% are in Asia, Africa and Latin America. Further, 95% of all illegal deforestation takes place within 5.5 km of a road. With the limited resources of our planet, it is of vital importance that this infrastructure is added in a sustainable manner to protect the environment and provide durable components. Several breakout sessions included providing forum attendees with handson exercises in road planning, methods for integrating wildlife needs into infrastructure, and addressing issues of financing, planning and improving regulations. The final session allowed top principles developed during the conference to be presented for future discussion and development.



VIETNAM

GLOBAL NEWS

International Construction Market Survey 2017 Released by Turner & Townsend

With a focus on construction costs in 43 international markets, Turner & Townsend's International Construction Market Survey 2017 has found several rising trends in the market. Construction costs are anticipated to continue to increase, with New York City taking Zurich's place in the lead for highest construction costs, along with London, Hong Kong and San Francisco. Over half of the market reported a shortage of skilled labour, which combined with the increasing number of projects noted in the report may cause increased costs for ongoing projects. Numerous countries are planning on renewing investment in infrastructure, including the USA under President Trump's new initiatives and Hong Kong's new three runway systems. The improvement in the labour markets have led to an increased demand in residential construction for Europe, specifically Germany, London and the Netherlands. Lastly, the fluctuating prices of commodities is impacting construction in the Middle East, with construction companies lowering profits to meet project needs.

GLOBAL



Quality and Safety: The Focus of International Construction Week 2017

Safety and quality have always been an essential part of a high-level construction industry, and Malaysia decided to make these tenets the focus of this year's International Construction Week, or ICW, which took place from April 10th to 14th, 2017. Run by the Construction Industry Development Board, or CIDB, the event's official theme was: "Towards Enhancing Quality and Safety in Construction.

About International Construction Week 2017

This was the 17th year of International Construction Week, which included modern goals of bringing Malaysia forward in the world stage. Nonetheless, this event also includes all of Southeast Asia and has an overall focus on the built environment, construction and energy, as well as sustainable design.

ICW includes an emphasis on the strategic goals of the Construction Industry Transformation Programme, or CITP, which are designed to help Malaysia move its construction industry forward and support Malaysia in reaching the goal of being a high-income nation. This year's ICW theme of Quality and Safety fits CITP's strategic goal of Quality, Safety and Professionalism. Its other strategies include Environmental Sustainability, Productivity and Internationalisation.

ICW was designed to focus on both the current situation and the future of the industry. On top of this year's theme, it discussed the advancement of women within the industry, methods for preventing contractual disputes, how profits fit in with safety and quality, and other important topics. It even included a career fair for young people to learn about roles within the industry, which could contribute toward the future.

Making Safety and Quality a Priority

When discussing the goal of improving professionalism, quality and safety, Chief Executive of CIDB Malaysia Dato Ir. Ahmad 'Asri bin Abdul Hamid said that "we believe this thrust forms the core pillar of the industry's transformation." He explained that such an emphasis on these three tenets is needed because there are problems with these areas within Malaysia's construction industry. He gave poor construction site conditions and a deficiency of proper quality controls as examples. He also explained that the current regulatory guidelines are complex.

"Quality and safety, when combined, becomes a highly potent formula in enhancing the overall public image and perception of the construction industry in Malaysia and around the world," said Malaysia's Minister of Works Dato' Sri Haji Fadillah bin Haji Yusof. As Malaysia works to become a developed nation, he noted that improving the level of safety and quality is more important than ever.

Steps for Focusing on Safety and Quality

International Construction Week included many programs, workshops and exhibitions giving ideas for improving construction safety and quality. As part of ICW, the International Construction Safety Leadership Conference centred on the idea of Construction Design Management, or CDM. This type of management provides a method of creating better quality and safety by having regulation that requires accountability for health and safety during every stage of construction, managing risks as the project goes on.

Another step forward is the Guidelines on Occupational Safety and Health in Construction Industry (Management) set forth by the Department of

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Occupational Safety and Health, or DOSH. These guidelines follow CDM and work to make safety and health major priorities of the construction industry. And CITP created a goal of cutting down 50 percent of the country's construction injuries and fatalities by the year 2020 from the fatality rate of 10.94 per 100,000 workers in 2015.

Many agencies and industry professionals came together at ICW, which is important to progress within the industry. The event included the Ministry of Works, the Director-General of DOSH, the Chief Executive of CIDB and many others who are important to improving the quality and safety of the Malaysian construction industry. In total, the event included about 15,000 professionals, as well as vendors and Ecobuild Southeast Asia as an exhibition focusing on the built environment.

ICW allowed many professionals, vendors and agencies to come together to share knowledge and learn from others, collaborating to promote the development of the industry and the region. On top of learning from each other, companies and agencies had the opportunity to create partnerships that would help them and the industry toward their goals.

To move forward and be a key player within the world, Malaysia and the region will need to solve current problems and work to create a construction industry that is respected and trusted. This year's focus of International Construction Week – Quality and Safety – provides a strong stepping stone toward the broader goal of progressing in the world.

Scenes from the ICW Opening Ceremony, Exhibition, and press mentions

ZYQ Manufacturing Launches Homegrown IBS Factory

On 19 April 2017, homegrown Bumiputra company ZYQ Manufacturing Sdn Bhd marked a milestone with the launch of its factory in Mukim Bukit Raja in Klang, Selangor. The new factory will support the company's venture into Industrialised Building System (IBS) manufacturing. IBS is a construction technique where construction components are built or made in controlled environments and then installed at the construction site. Dato' Ir Ahmad 'Asri bin Abdul Hamid, CEO of CIDB, was the guest of honour at the event and he was accompanied by other management personnel from CIDB.

During his speech, Dato' Ir Ahmad 'Asri praised ZYQ, which consists of parent company ZYQ Engineering and its subsidiary ZYQ Manufacturing, for its successful foray into IBS. "I want to congratulate the entire team at ZYQ for going into this field because it is very relevant," he said. "But I advise them not to rest on their laurels, instead continue to work harder, become more innovative, and increase your competitive edge."

ZYQ Engineering was established in 2012 by its founder and CEO, Mohd Zikri bin Md Zaini, with the aim of providing affordable housing, particularly for low-income communities. However, Mohd Zikri soon discovered that construction of houses took up a lot of time and involved the use of a substantial amount of wood. He was convinced that the construction process could be made more efficient with the use of the right method and materials. After conducting extensive R&D, ZYQ came up with an IBS product called E-zyq.

In his speech during the launch, Mohd Zikri recounted how as a small player in the local construction industry, ZYQ Engineering sought to seek a competitive edge. "It was a huge challenge for us as a new company looking to establish our name and reputation. We decided that product innovation was the best way for us to penetrate the market." The journey to developing their product began at CIDB's annual International Construction Week. "Every year, we would attend ICW to observe and study the latest technologies in IBS. In 2015, after gathering sufficient input on IBS, we

established ZYQ Manufacturing Sdn Bhd." The subsidiary enabled ZYQ to streamline its entire IBS operation, which was also supported by its first two factories. However, demand for its product soon surpassed the production capacities of the factories, leading to the decision to combine both into a larger factory with a much higher production capacity.

ZYQ MANUFACTURING

www.zyqengineering.com

A GROUP COMPANY OF ZYQ HOLDING SDN BHD

(1170076-M)

ZYQ has built more than 100 dwellings throughout Malaysia using the E-zyq system. According to Mohd Zikri, its IBS product provides a lot of savings compared to conventional methods of construction. "By employing IBS, we can reduce manpower by 30 percent and reduce material costs such as cement, bricks and sand by up to 50 percent compared to conventional methods." He adds

CTUE

EVENTS & UPDATES | HEIGHTS

Dato' Ir Ahmad 'Asri bin Abdul Hamid, Chief Executive of CIDB, praised ZYQ for their foresight and construction productivity

that IBS allows for cheaper, heatresistant, durable, environmentally sustainable, innovative, and flexibly designed homes.

Aside from investing RM500,000 of its own capital on the new factory, ZYQ has also submitted an application to patent the E-zyq system. The IBS product has been approved by SIRIM and the Malaysian Fire and Rescue Department. Adding another feather to its cap, ZYQ is ranked number one among companies owned by young entrepreneurs (Mohd Zikri is 31 years old) to receive recognition as a valid "IBS Manufacturer" from CIDB.

"We've witnessed how a fledgling company headed by a young CEO has taken courageous and proactive steps to build an IBS factory and has invested half a million ringgit in it. It is a most welcome move and is in line with what we hope for and are trying to promote in the local construction industry," said Dato' Ir Ahmad 'Asri. "We believe IBS is a way to realise the transformation of the construction industry and we wholeheartedly encourage more developers to venture into this field."

ZYQ Engineering CEO Mohd Zikri bin Md Zaini gave a tour of the factory and its IBS products

Making Inroads for Sustainability in MEGA BROJECTS

Tan Sri Datuk Seri Lim Keng Cheng Managing Director of Ekovest Berhad Tan Sri Datuk Seri Lim Keng Cheng leads the way at Ekovest Berhad, a master builder known for incorporating sustainable methods in mega construction projects such as the DUKE Expressway. HEIGHTS sat down with the homegrown expert in sustainable construction, for a conversation on the Malaysian construction industry with a focus on environmental sustainability practices.

An impressive showcase of futuristic developments and glass-and-steel meeting rooms, the Ekovest Berhad sales gallery on Jalan Gombak bears little resemblance to the finance company branch that once occupied its location. And yet, we're told by Tan Sri Datuk Seri Lim Keng Cheng that much of the original building was left intact during the gallery's construction.

"In conventional construction, people generally tear down the building and rebuild on the same site," he says. "We didn't. We just opened the shop-lot up a little bit and pushed up the roof. Within two months, the sales gallery was ready for launching. You put more time and effort into design, but when it comes to construction, you save time because the original structure is still there. I choose to do it this way because I don't like to waste."

That emphatic last statement is telling. As Managing Director of Ekovest Berhad, Lim is instrumental in transforming the small construction outfit he co-founded in 1985 with his uncle, Tan Sri Lim Kang Hoo, into a public-listed group of companies with a strong presence in construction, civil engineering and infrastructure, property development and toll concessions – and a formidable no-loss record since its inception.

But increasingly, he is also making his mark as a vocal champion for incorporating sustainability in his industry, and a leader who walks his talk. For good measure, Ekovest's in-house magazine is titled Sustainability.

Lim's relationship with all things sustainable goes back to his childhood. Working as a contractor, his father had the habit of rescuing old timber from demolished buildings, which he would then stack up in front of their house for passers-by to take and re-use. "My father told me that we cut fewer trees when we recycle. He instilled in me a strong aversion towards wastage."

Senior Lim passed away from kidney failure when Lim was only 14, but by then, the seeds had been planted. So, from the start, he didn't think twice about applying those sustainability principles in his projects, even though the concept was still in its infancy back then.

Respecting topography: Universiti Malaysia Sabah

Universiti Malaysia Sabah (UMS), a project that he worked on in the mid-90s, is an early example of this approach. Because of the land's topography, Lim faced the technically tricky challenge of having to connect land banks of varying elevations. The conventional and more popular way was to build a retaining wall (a rigid upstanding wall) between two platform levels.

Such a method posed two problems: One, it would bust their budget. Two, and more seriously, the solution wasn't durable. "The problem with retaining walls is that after five to ten years, if maintenance is poor, the walls will collapse," explains Lim. "That's why you read in newspapers about such structures giving way and so on. To build the walls, you'd also have to dig up soil and disturb the topography."

Lim came up with an out-of-thebox solution: create sloping hills between the different elevations like the rolling profile, or undulating terrain, in a golf course. By limiting cut-and-fill during construction, the natural topography and original landscape character of the site was preserved, so the look of the campus is very natural. As a bonus, the terrain was conducive to vegetation growth as well.

Natural solutions: Universiti Tun Hussein Onn

Lim's next big technical challenge was Universiti Tun Hussein Onn in Batu Pahat, Johor. Here, the water table was higher than the ground level, causing one section of the campus to be submerged 400 mm under water, without fail, during the monsoon season.

Drawing inspiration from the city of Amsterdam, where much of the land is below sea level, Lim proposed the practical solution of creating ponds to retain the excess water and using existing soil to create bunds around the affected area – just like a "mini-Amsterdam". That way, when it rains, the water would flow over into the pond. Not only did this solve the campus' flood problem, it created a pleasant landscape for members of the university to experience.

With his track record for designing, developing and constructing creative, cost-effective and resilient infrastructure, it was only a matter of time before Lim would graduate to mega projects like DUKE and River of Life.

Efficient energy usage: DUKE Expressway

PLAN

The plan for Phase 1 of the Duta–Ulu Klang Expressway (DUKE) generated shockwaves when it was first unveiled in 2004. Instead of circumnavigating the outer perimeter of the Klang Valley, the proposed expressway had the audacity to cut right across the heart of the city, something that had never been done before in the history of highway construction in Kuala Lumpur. It made perfect sense to Lim. "We are building a highway connector that would offer a shortcut," he points out, "not any ordinary highway."

"I have calculated all my advantages and I build for function. That is always my approach."

Lim has been known to call DUKE his "green highway" because, "Building in this sense cuts down on carbon emissions. When the structure is shorter, you shorten construction time. When there is less area involved, less concrete is used. Do you know that to melt steel, you need to heat the metal up to 1000 degrees? All these are competing with us for oxygen. A lot of people think planting trees will help. The trees produce oxygen in the morning, but at night they also take oxygen like you and me. It's not enough. The best way is to

"People say that when you build highways, you create environmental issues, but we are building on top of council roads. The project was mostly being built on government land and did not affect any existing or approved residential areas. I helped the government save on subsidies because all the cars will use fuel more efficiently, rather than be stuck in heavy traffic jams. Since the

cut down on consumption of energy

and material."

The Duta–Ulu Klang Expressway was designed to reduce carbon emissions in construction and usage

highway is shorter, everybody will use it because it saves time. By travelling a shorter distance, you save fuel."

"I have calculated all my advantages and I build for function. That is always my approach." His logic is hard to argue with, especially when you look at the facts. Ekovest recently scored a coup when the Employees Provident Fund (EPF) bought a 40 percent equity interest valued at RM1.13 billion in Konsortium Lebuhraya Utara-Timur (KL) Sdn Bhd (Kesturi), which owns DUKE 1 and 2. Kesturi is a whollyowned subsidiary of Nuzen Corp Sdn Bhd, which in turn is a wholly-owned subsidiary of Ekovest.

Even more impressive, the upcoming DUKE Phase 3 is Malaysia's first highway infrastructure project to be rated under the Envision Sustainable Infrastructure Rating System. A joint collaboration between the prestigious Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design and the Institute for Sustainable Infrastructure, Envision evaluates, grades and gives recognition to infrastructure projects that use transformational and collaborative approaches to assess the sustainability indicators over the course of a project's lifecycle. It's safe to say, Lim's initial assessment about DUKE's viability was on the money.

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"Before we do something, we ask ourselves, Does the community need it? Only after studying the benefits and planning for it, do we then introduce new features. Everything we do must add value. For example, when we implemented the full electronic toll system at three toll plazas, there was some noise about the inconvenience of a cashless payment system. People think I just want to cut down on my operations cost, but actually, I have a long-term plan in mind." he says.

Lim's masterplan is for DUKE 1, 2, and 3, and part of SPRINT to form the new KL City Bypass for motorists to bypass congested city

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roads. Under the first phase, 10 Integrated Park & Ride stations will be constructed on top of, beside or under the Expressway. These Park & Ride Stations will be constructed next to public transportation systems to encourage motorists to park their cars and hop onto the Monorail, KTM Komuter, LRT or MRT to get into the city.

The cashless card comes into play at every interface: to pay at the toll booth, to enter the car park and to take the KTM Komuter into the city. The net effect: traffic congestion is reduced. Lim says, "Even when we do small things, we actually have a bigger picture in mind. In this case, we want the public and private transport systems to be integrated. We plan ahead for integration. Infrastructure must be planned ahead to grow with the population. That's a core part of sustainability."

Rejuvenating the city: River of Life

Most people immediately think of sustainability in terms of natural resource protection, but to Lim, its meaning is more holistic. Sustainable development must help local economies, design opportunities for social interaction, create memorable experiences and generate stronger real-estate value. To achieve this, it is imperative to strike the right balance between natural, cultural, functional and aesthetic considerations. "Developers must ask themselves, what else can we do to help people live balanced lives?" That's the key question that drives him, in Ekovest's most ambitious project to date: River of Life.

An Entry Point Project identified in the Greater Kuala Lumpur/Klang Valley National Key Economic Area (NKEA) under the Economic Transformation Programme (ETP), the River of Life project is, in a nutshell, a Private-Public Partnership to clean up and beautify the eleven-kilometre corridor stretching along the Klang-Gombak Rivers and develop the land surrounding it.

As a Project Delivery Partner for River of Life, Ekovest manages KL River City, the name for the company's ecosystem masterplan designed around the group's property development projects on the River of Life corridor. Specifically, this refers to the 2.2-kilometre stretch between Puah Pond and Pekeliling.

Built on the idea that "every great city has a river flowing through it", KL River City seeks to emulate the best practices exemplified by three world-famous river landmarks: the Yarra River as the role model for urbanisation, the San Antonio River for flood control, and Chenggyecheon for public utilisation. The idea is to transform the area into a vibrant and liveable waterfront with high economic value; think cycling paths, water taxis, and thriving recreational facilities. Naturally, it will also boast top-notch accessibility, for it sits at the crossroads of major intracity highways, including DUKE 2 and a robust public transportation network that includes the MRT and LRT lines.

"What we want is for people to come here and enjoy the beautiful lifestyle it offers," Lim says. In the process of developing the masterplan,

mar

Lim's emphasis on sustainability is an expression of values learned from childhood



Lim says KL River City will spearhead riverside development which will not only bring new life back to what has traditionally been prime property but also indirectly highlight the River of Life project.

AA

The KUALA Lumpur River City development is set to lead the way in many things and chief among them is showing the potential a revitalised river system holds

The mixed development located along the banks of Sungai Gombak is among the first to take advantage of the RM4.4bil River of Life initiative, a government project that intends to improve the water quality of the river until it is good

The picture painted by developer Ekovest Bhd is a picturesque one, with water craft carrying passengers along the river and people walking along a riverside

In a country like Malaysia where it rains half the year, there is always the worry that a river may overflow its banks, but Ekovest is confident that its special "We have done plenty of research and were inspired by a few proje world. Our design's goal is to keep the upper

KL River City is built on the idea "every great city has a river flowing through it"

land to maximises the use of

PRIME MOVER | HEIGHTS 17

Lim personally visited San Antonio, Korea and Melbourne. He even tested the mechanical pump and checked out the dirty flood water personally. On his hands-on approach, he advocates, "To be successful, you must continually educate yourself. Read a lot, but don't just believe everything you read. Ask a lot of questions. When you travel, absorb the best practices, but also think about how things can be improved so you don't make the same mistakes," he says.

Which is exactly what he did for KL River City. He adopted the double-decker river system from the San Antonio River project model, which uses a mechanical system to channel floodwater to flow underneath, but refined the methodology. "By identifying a specific stretch in the river which had the right gradient to allow for gravity flow, we found that we didn't need to use a pump. This will help us in our goals to ensure sustainability and to save energy consumption."

To him, the River of Life project goes beyond a building or construction project; it's about rejuvenating the city he calls home. Lim has an understandable soft spot for Northern Kuala Lumpur, which encompasses Sentul, Setapak and Gombak, the township where he was born and raised. "The area is still in need of revitalisation and redevelopment. With holistic planning, we aim to transform this into a liveable place and ultimately uplift the image of Kuala Lumpur as one of the top 20 most liveable cities in the world."

Lim's plans may sound ambitious, but with his vast experience and expertise and the backing of his solid team, he's confident that he will be able to bring his vision to life for the betterment of the nation.

Elevating Sustainable Construction in Malaysia

An Interview with Dato' Ahmad 'Asri Abdul Hamid

The construction industry lends itself to an obvious metaphor about nation-building, but its actual contribution is not as easily quantified. In fact, it is easy to overlook the significance of the construction industry to the Malaysian economy, given its low GDP contribution of 3.5% to 4%, but the figure doesn't consider the industry's overlap with other sectors through its downstream and upstream activities.

As Dato' Ir Ahmad 'Asri Abdul Hamid, Chief Executive of CIDB points out, the industry's contribution to GDP is based on services only.

"If you look at the overall picture, the construction industry supports about 120 other industries, include manufacturing, professional services, and even finance," Dato' Ahmad 'Asri explains. "For example, the construction of bricks falls under manufacturing. As construction supports a lot of other industries, it has this multiplier effect of two – which means that if the government puts in RM1 into the construction industry, the output to the GDP will be RM2."

Dato' Ir Ahmad 'Asri Abdul Hamid, Chief Executive of CIDB It comes as no surprise then, that during periods of economic downturn, the government will pump money into the construction industry. The cascading effect it has on other industries helps jumpstart the recovery of the economy. Furthermore, the industry contributes about 9.5% of employment, which comes to about 1.2 million personnel of the workforce in the country. As the backbone of the Malaysian economy, construction has a crucial role to play in realising the government's aim of becoming a developed nation by 2020, which is why Dato' Ir Ahmad 'Asri Abdul Hamid maintains that a transformation is crucial to the industry.

This transformation is guided by the government's Construction Industry Transformation Programme (CITP), which was launched in 2015 and covers a five-year period from 2016 to 2020. The CITP is a blueprint that comprehensively details the current scenario in the industry and makes the case for why changes are needed, as well as the initiatives that will be implemented to achieve these changes. "The CITP is very action-focused. It has four strategic thrusts and under that we have 21 initiatives. Each initiative includes actions that need to be taken within a stipulated timeframe, and the person responsible for it. We monitor this continuously," Dato' Ahmad 'Asri explains.

Since the CITP was developed to support the government's target of achieving developed nation status, its initiatives were designed in tandem with the goals of Vision 2020. One of these goals is to reduce the country's carbon emission per GDP by 40% by 2020, from the baseline of 2005. In line with this target, the construction industry has set its own aim under the CITP to achieve a reduction of four megatonnes of CO2 per year.

"As such, we need to monitor the amount of carbon being produced. We've always believed that what you are not able to measure, you are not able to manage. So, we came up with a rating tool called MYCREST (Malaysian Carbon Reduction and Environment Sustainability Tool)," says Dato' Ahmad 'Asri.

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On how MyCREST will address these and other challenges that develop in the future, he said, "MyCREST is not just a sustainable building rating tool. It is also a comprehensive guide to all project owners to be incorporated in any design of a project's development. Holistically, if you have incorporated all the requirements in a design and sustainability practices are being adopted, it will be reflected in the completed development and further translated during operation and maintenance of the building."

As Chief Executive of CIDB since March 2016. Dato' Ahmad 'Asri is personally responsible for the implementation of the CITP. Prior to this appointment, he was the Senior General Manager of the Management Sector in CIDB for over fifteen years. His long and storied career in public service, which spans more than three decades, has seen him take on a wide range of roles, like heading the Business and Corporate Divisions and the Development Sector of CIDB and working as a mechanical engineer in the Public Works Department for 13 years.



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Guidelines for Sustainable Construction

"What we want to do is to look at sustainability throughout the value chain or lifecycle of a project. At the moment, too much focus is being given on construction only. We want to go for sustainable development, which covers three areas in particular. The first is the high energy consumption from operating buildings, which includes electrical systems such as air-conditioning, lights, and computers. Second is to reduce waste. The construction industry contributes the most amount of solid waste and the highest in terms of volume," says Dato' Ahmad 'Asri, adding that too much waste is being dumped into the ground, leading to a scarcity of landfill areas. "Everybody is taking this for granted, but land is becoming scarcer, so we are not sustainable."

Third, Dato' Ahmad 'Asri maintains that sustainability is also about protecting the occupants and ensuring a comfortable environment for them, so that they are more productive in the workplace. Thus, the discussion about sustainable construction should cover these three areas, he says.

These issues have to be addressed in a holistic manner, adds the Chief Executive of CIDB, saying, "If you want to do construction projects but vou don't take into account sustainability, then later, the cost of making it sustainable is very expensive. If you really want to go for sustainable construction and make it cost effective and beneficial. vou have to do it right from the start." The process of ensuring sustainability in fact, must happen at every stage of the construction cycle, from design and planning to construction and operation, states Dato' Ahmad 'Asri.

"That is why we believe at the moment, that the best way to change the industry is to have some kind of tool to guide it so that the whole process from planning to operations will take into account sustainability factors. MYCREST provides the checklist and guidelines for achieving sustainable construction," he says.

Through MYCREST, projects are scored at every stage of the construction cycle and then rated according to the total score.

"A 5-star rating means your project is very good. And there are already a number of buildings with 5-star ratings, such as the Kompleks Kerja Raya 2 (KKR2) Tower, which has won lots of awards and has been named one of the top ten high-rises in the world," says Dato' Ahmad 'Asri.

A 5-star rating gives buyers a good impression of houses and apartments on sale, which should reflect well on the developers. That should be sufficient incentive for companies to pursue sustainable construction, says the Chief Executive of CIDB.

"However, if you have a bigger picture in your mind, you will also be thinking about how our children are going to live in this world, and



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that should be the reason for emphasising sustainable construction," he opines.

Major developers such as IJM and Gamuda are already responding to the clarion call for sustainability, and as more companies do the same, Dato' Ahmad 'Asri says more can be done to further improve sustainability in the industry, such as benchmarking and mandatory adoption of rating tools.

"I recently visited the Gamuda IBS plant in Sepang; the way construction is done there, everything is automated and robotic. They key in their designs into the computer, which will produce the components according to exactly what is needed, which significantly reduces the amount of waste." he elaborates. "Because it is all measured and cut precisely, the factory is very clean and then they assemble the components at the construction site. It is very fast and smooth, and that is the kind of sustainable practice we want to incorporate."

Achieving a Culture of Sustainability

In order to promote MYCREST and sustainable construction in general, CIDB has established MAMPAN, the Centre of Excellence for Sustainable Construction.

"MAMPAN will be a reference centre as far as sustainable construction is concerned. The way we want to do it is through strategic collaborations with other parties like universities, academicians, industries to assist people in adopting

"One of the outcomes we are trying to achieve is to make Malaysia a leader in the region when it comes to sustainable construction." – Dato' Ahmad 'Asri

sustainable construction," says Dato' Ahmad 'Asri.

Through MAMPAN, CIDB also will organise exhibitions, seminars and roadshows to promote MYCREST and sustainable construction. While he acknowledges that there is a lot to be done, Dato' Ahmad 'Asri notes that Malaysia is among the leaders in the ASEAN region when it comes to sustainable construction.

"Together with Singapore, we are moving quite fast in this initiative. One of the outcomes we are trying to achieve is to make Malaysia a leader in the region when it comes to sustainable construction," he says, noting that while many other countries around the world have adopted environmentally friendly practices, sustainability is still not fully entrenched as a way of life.

"I don't think there are many countries in this world where sustainable construction is a culture. Of course, there are leading countries like Denmark and maybe the UK to an extent," Dato' Ahmad 'Asri concludes. "The challenge eventually is to make it a culture so that everybody does it naturally, nobody has to mandate it, nobody has to enforce it. It's just the way of doing things. That's the level we want to reach."

MyCREST: A Sustainability Rating Gamechanger



While alarm bells have been sounded on the dangers of climate change, many fail to grasp the full measure and enormity of its impact until they are confronted with it. This point was made clear during the floods on the East Coast of Peninsular Malaysia from December 2014 to January 2015 that affected the lives of hundreds of thousands and resulted in loss of life. The destruction of public

infrastructure amounted to billions of ringgit, and approximately RM800 million was spent for repair and reconstruction of schools, hospitals, and bridges. A calamity unprecedented in terms of severity and extent, the floods took the country by surprise and left many reeling in horror at the untold damage it wreaked. It drove home the realisation that measures need to be taken to ensure that our buildings and infrastructure are more resilient to natural disasters.

A sustainability rating system is crucial in this regard and the response in Malaysia needs to be more urgent. Current rating systems have had a low adoption rate, so less than two percent of buildings and infrastructure in the country are rated for environmental sustainability. While there are already a number of rating tools in Malaysia, CIDB is counting on MyCREST (Malaysian Carbon Reduction and Environment Sustainability Tool) to be the industry gamechanger that will bring about a much-needed paradigm shift.

A rating tool developed in line with the Construction Industry Transformation Programme (CITP), MyCREST guides the development of building projects at every stage from design and construction to operation and maintenance by ensuring that it adheres to sustainable development practices. It also aims to quantify actual carbon emission at every stage of a building's lifecycle.

"We strongly believe that the adoption of sustainability rating tools such as MyCREST will play a key role in mitigating the construction industry's impact on the environment," said Dato' Ir Ahmad 'Asri Abdul Hamid, Chief Executive of CIDB, during an interview with HEIGHTS.

What sets MyCREST apart from existing tools is its carbon calculator, which enables a comprehensive assessment of both embodied carbon and operational carbon, he maintains. Furthermore, Dato' Ahmad 'Asri points out that MyCREST is

Menara KKR2, HQ of the Ministry of Works and PWD, undergoing MyCREST certification

a holistic approach that considers social and cultural sustainability, in addition to various environmental sustainability criteria.

"It is a more comprehensive rating tool that complements existing rating tools, as it provides an added dimension by quantifying carbon emissions and the integration of socioeconomic wellbeing. Given its advantages, we are aiming to establish it as a national rating tool," he says, adding that CIDB has outlined its goal to use MyCREST to assess all large-scale building projects by 2020.

The effort has the backing of the Ministry of Works, which has committed to assessing all projects above the amount of RM50 million by

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the Public Works Department (PWD) under the 11th Malaysia Plan using MyCREST. This is a key example of how public projects can lead the charge on sustainable practices, stressed Dato' Ahmad 'Asri. He added that the Ministry of Energy, Green Technology, and Water has also offered their support to adopt the use of MyCREST in assessing their projects. Additionally, several private developers have expressed keen interest in rating their projects through MyCREST.

A portal dedicated to MyCREST, which will contain all information related to the rating tool, including its evaluation method and application process, is being developed. The portal is expected to be ready and accessible by the end of the year. In the future, applicants may submit their application for MyCREST rating through the portal. CIDB is also actively raising awareness on the benefits of assessment through MyCREST, and the importance of adopting sustainable practices in the construction industry through seminars, workshops, and awareness campaigns. "By taking up MyCREST, the building sector will directly contribute to the four mega tonnes of CO2 annual carbon emission reduction target," Dato' Ahmad 'Asri pointed out.

Exemplary Green Building Projects

The SP Setia headquarters and Wisma REHDA are examples of buildings that have been certified by MyCREST. Another noteworthy example of an environmentally sustainable building project is the Kompleks Kerja Raya 2 (KKR2) Tower located on Jalan Sultan Salahuddin. The 37-storey high-rise is the headquarters of the Ministry of Works and the Public Works Department. KKR2 has been dubbed "a diamond in the crown of the Malavsian construction industry" not just for its striking diamond-like facade, but also for setting a shining example in green building architecture, construction, and design. It fulfils the criteria for environmental sustainability through efficient use of natural resources. eco-friendly design and materials, and the comfort afforded to occupants.

The building's facade is made from low-emission triangular glass pieces, which limits the intensity of the glare and heat of sunlight through a triple-glazing system, enabling a lower cooling load. By utilising glass partitions, perforated venetian blinds, and low-height workstations, the building allows natural light to illuminate its interiors, resulting in significant savings in electricity charges. The tower has a rainwater harvesting tank to collect rainwater, and a wastewater treatment system to treat excess water from washbasins and floor traps, to be reused for flushing and landscape irrigation. A terraced roof garden at its top floors provides a breath-taking view of the city, while the window glazing and lowered canopies enable airflow and provide protection from the sun. Menara KKR2 is currently undergoing MyCREST certification.

While MyCREST was developed to evaluate buildings, CIDB is now in the process of coming up with a sustainable infrastructure rating tool to provide similar assessment for infrastructure projects such as highways, dams, and railway systems. The DUKE 3 Highway and West Coast Expressway (WCE) have been selected as the pilot projects to be assessed by this tool. "The tool is expected to be completed for testing in 2018 and is anticipated to be implemented in the industry by 2020," said Dato' Ahmad 'Asri.

WISMA REHI





Green Wisma REHDA, MyCREST-certified building

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MAMPAN: Driving Environmental Sustainability in Construction

SUSTAINABLE CONSTRUCTION EXCELLENCE CENTRE

Society

Economy

The most tangible indications of a nation's development are its buildings and infrastructure, but the construction of housing developments, highways, towering skyscrapers, and iconic landmarks come at a heavy cost. Buildings are estimated to contribute up to 40% of global greenhouse gas (GHG) emissions. From the amount of resources used to construct them, to the amount of energy required to operate and maintain them, and the amount of waste they generate once they are demolished, buildings and infrastructure exert a heavy toll on the environment throughout their entire lifecycle. In an era where climate change is becoming an increasingly urgent concern, it is imperative to revisit the practices and policies of the construction industry to ensure they are in keeping with environmental sustainability requirements.

Chief Executive of CIDB, Dato' Ir Ahmad 'Asri Abdul Hamid, shed some light on CIDB's efforts at addressing these issues through the establishment of the Sustainable Construction Excellence Centre (MAMPAN). It is one of the main initiatives in the overarching plan of the Construction Industry Transformation Programme (CITP), which is guided by four strategic thrusts. The second thrust, which focuses on Environmental Sustainability, highlights five core initiatives:

- E1: Drive innovation in sustainable construction
- E2: Drive compliance to environmental sustainability ratings and requirements
- E3: Focus on public projects to lead the charge on sustainable practices

- E4: Facilitate industry adoption of sustainable practices
- E5: Reduce irresponsible waste during construction

"The outcomes from thrust two by 2020 are that 100% of large building and infrastructure projects exceed sustainability requirements and that the industry achieves a reduction of four mega tonnes of CO2 per year," says Dato' Ir Ahmad 'Asri.

MAMPAN will spearhead the effort to realise these outcomes through its role as a point of reference for the development of initiatives and programmes to implement environmentally sustainable practices and drive industry compliance. Its stated mission is to improve the lives of people by developing, promoting, and implementing sustainable construction systems and practices in Malaysia and beyond. Through the provision of training and awareness programmes, MAMPAN intends to inculcate the value of environmental sustainability and facilitate the adoption of its best practices in the construction industry.

As indicated in its mission, the centre's goals are far-reaching. MAMPAN also aims to position itself as a premier referral centre on sustainability in construction within the ASEAN region. To achieve this objective, it will collaborate with local and international universities to form research partnerships aimed at leading and implementing innovative practices in sustainable construction methods. To date, MAMPAN has established research partnerships with UTM, UKM, USM, and the REHDA Institute, says Dato' Ahmad 'Asri.

Raising Industry Standards

The movement towards environmental sustainability has already gained traction in the construction industry as evidenced by the growing number of vendors and suppliers providing green products at competitive prices, notes Dato' Ahmad 'Asri, adding that a number of companies in the private sector, especially many hotels, have also adopted environmentally friendly practices, not just at the construction but also at the operational stage. To further encourage this development, the government has come up with the Government Green Procurement (GGP) initiative.

GGP refers to the acquisition of products, services, and work in the public sector that considers environmental criteria and standards to conserve the natural environment and resources, as well as minimise and reduce the negative impact of human activities. CIDB targets that by 2020, the following projects will be part of the GGP initiative: Technical and Vocational Education Faculty. Universiti Pendidikan Sultan Idris and Pusat Latihan Keselamatan Perlindungan Malaysia, Bandar Baru Enstek, Negeri Sembilan. Both projects are also being assessed through MyCREST, a sustainable rating tool implemented by MAMPAN.

"GGP will create demand from the public sector for green products and services, thus encouraging a rise in industry standards to meet sustainability requirements," says Dato' Ahmad 'Asri.

Addressing Major Issues

Another major issue related to environmental sustainability that will be addressed through the CITP is the wanton disposal of construction waste. The construction industry generates a huge amount of waste, both in terms of volume and bulk, which contributes to the diminishing capacity of landfills in the country.

"Many contractors do not take this issue seriously," cautions Dato' Ahmad 'Asri. "Construction and demolition (C&D) waste such as concrete can be recycled into construction aggregates. They can be recycled into gravel, for instance, that can be used to tar roads."

At the moment though, the country has only one landfill equipped with the facilities to recycle C&D waste, which is in Sungai Kertas, Gombak. CIDB is currently working with Jabatan Pengurusan Sisa Pepejal Negara (JPSPN) and SW Corp on several initiatives to improve the situation. One of them involves

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establishing a baseline to measure the rate of recycling C&D waste in the country. The baseline will also be used to gauge the level of awareness on the importance of recycling among building contractors. Based on the data and information obtained, further initiatives can be developed to improve awareness on recycling C&D waste and to equip more landfills with the capacity to recycle C&D waste.

"JPSPN and SW Corp are also in the process of strengthening the relevant laws related to C&D waste so that recycling will become compulsory. Collectively, we are working at reducing waste generation by enforcement through policy and by providing the facilities to support the ecosystem," Dato' Ahmad 'Asri says. "Based on these efforts, we expect an increase in C&D waste recycling, which will also contribute to the objective of achieving environmental sustainability."

A mindset adjustment is needed to heed the call to go green, because many are still under the erroneous impression that the cost of adopting environmentally friendly practices is prohibitive. The Chief Executive of CIDB also points out that while this might have been true a few years ago, the argument no longer holds water, as prices for green products such as solar panels have become more competitive due to increasing demand. Furthermore, he contends that the costs outweigh the benefits in the long run.

"While certain strategies in achieving environmental sustainability require additional costs, it should be considered as an investment for profit or savings for the future," Dato' Ahmad 'Asri maintains. "Profit is not only focused on ringgit and sen, but is also measured by its worth in terms of how it benefits the environment, people, and economic systems. And that is the core principle of green building."

Eco-Viaducts to Provide Safe Passage

The photo of elephants stepping across a steel barrier by the East-West Highway makes for a striking sight. In fact, the sight is so enthralling that a motorist narrowly avoided collision with the pachyderms, according to the article that was published in a local daily. While the image may even seem amusing, it clearly illustrates a potentially dangerous situation. Many animals have ended up as roadkill as a result of trying to cross a highway. Human lives are also at risk when a speeding vehicle collides with an unsuspecting animal.





Highways open doors to poaching

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The human-wildlife conflict occurs when vast tracts of forests are cleared to make way for infrastructure projects. As their habitat shrinks due to forest fragmentation, animals lose access to the wider territory that provided them with sustenance, prey, and breeding partners. This puts their survival at stake, which also has damaging consequences on the country's natural ecosystem.

The Public Works Department (PWD) took these concerns into account when they designed and built the Second East-West Link, which runs from Simpang Pulai in Perak to Kuala Jeneris in Terengganu. To avoid the collision between wildlife and traffic. PWD constructed an elevated concrete structure called a viaduct as a section of the highway between Aring in Kelantan and Pasir Pulau in Tasik Kenyir, Terengganu. The passage below the viaduct facilitates animal movement between the forests on either side of the highway. To draw the animals away from the road and condition them to make use of the crossing, the area below the viaduct, which had been cleared for the project, was replanted with vegetation. Aside from creating a

pasture and artificial salt licks, an electric fence was also installed on each side of the Aring–Tasik Kenyir Road to help steer the animals away from the road and onto the safe passage under the viaduct.

According to newspaper reports, evidence of wildlife using the crossing has been confirmed through cameratrap photos set up by Perhilitan and wildlife researchers. The species that have appeared on these images include the elephant, leopard cat, gaur, serow, tapir, civet, barking deer, sambar deer, and wild boar, among others.

The construction of eco-viaducts supports the goals of the Central Forest Spine Masterplan (CFS), an initiative by the government to link up four major forest complexes in Peninsular Malaysia with a network of ecological or green corridors to create one contiguous, forested wildlife sanctuary. Through the construction of wildlife crossings that offer animals a safe passage to travel through fragmented forests, the aim is also to secure the country's population of wildlife, especially species that are facing the threat of extinction.

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Unfortunately, the Malayan tiger falls under this category with their numbers in the wild estimated at only 250 to 340. To reverse the declining number of tigers in the country, a National Tiger Conservation Action Plan (NTCAP) was conceived. Under the NTCAP, tiger habitats will be mainstreamed into national spatial plans such as the CFS through the protection of priority tiger habitats. Ecological corridors will also be developed to link priority tiger habitats with the rest of the tiger landscape.

An example of this is the eco-viaduct constructed in Sungai Yu near Merapoh, Pahang. Sungai Yu is a crucial forest corridor that connects the large tiger habitats of Taman Negara and the Main Range. The Kuala Lipis–Merapoh trunk road had separated the forests, so when the road was upgraded to the four-lane Central Spine Road, eco-viaducts were also constructed to ensure that wildlife still had a passage to move between the Main Range (at Sungai Yu Forest Reserve) and the Tanum Forest Reserve near Taman Negara.



HILING HUMAN AND ANALANA

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Compliance Data: Here's the GIS of IT

We've all seen examples or heard tales of what happens when a construction project doesn't go according to plan. A bridge or highway is started by two construction crews, just to realise they're a hundred metres off from where they should be when they meet in the middle. A home that floods every time it rains because the designer didn't take local weather patterns into account. A building has exposed beams or columns in the middle of the hallway because the initial measurements were off. In all these examples, having easy access to additional information, such as precision mapping, climate analytics, or 3D virtual reality (VR) visualisation would have helped ensure the final outcome was a success. But beyond these problem projects, a high level of coordination and analysis can make a huge difference in bringing a project from initial concept to final reality.

Before Geographic Information Systems (GIS) came into existence, construction projects were often a tangled mess. To start, a project would be planned, getting the basics of what it had to do down. It would then go to an architect who may work with a range of engineers and specialists to determine what would be required in the design to make it work on that site. If any of these individuals transposed a number, made mistakes in their analysis or didn't take every aspect of the project, land, and surrounding features into account, it could lead to serious problems down the road. Once the plans had been drawn up, construction crews would go in to begin laying out the project, grading the land and installing some of the primary utilities, such as electrical, gas, water, sewer and communication lines. If there was a problem that required the crew to deviate from the plans, such as raising a piece of a sewer pipe over a high point in the bedrock, it could cause problems in the future, such as a broken line due to the pipe being too close to the surface and heavy traffic. During this entire process, project managers would spend countless hours on the job site, checking the rate of progress, level of completion, and any issues that were coming up.

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This process provided a lot of room for error as well as wasted manpower and increased construction costs. The amount of manpower required to keep the project rolling smoothly was often prohibitively expensive, so project managers were often used for multiple projects at a time to help reduce the cost. Unfortunately, this often resulted in job site problems taking hours to fix as the project manager was contacted, pulled off another job site, and travelled to the problem job site. Construction workers would often end up sitting idle while waiting on the manager, wasting money when work wasn't happening. Rental equipment would sit idle while still costing the project money in the long run. Fortunately, the development of new digital technologies is making this problem, process, and expense a thing of the past.

The need for timely and accurate data in construction projects has led to the implementation GIS technology which can collect, manage, analyse, and visualise spatial data, turning a jumble of numbers and points into a comprehensive whole. This allows the information to be manipulated to apply real-world information to a digital design. It virtually eliminates the necessity of paper maps while providing accurate, up-to-date information to decision makers and key stakeholders for the project. It combines the precise location of the project with the features of the area, including climate, slope, soil conditions, transportation access, man-made features, water supply, and many more possibilities. The system eliminates the need for paper maps and provides key information to decision-makers and project stakeholders. Here are some examples of exactly how GIS works through the planning, development and construction phases of project.

Phase 1: Planning

When a project is first conceived, there is often a focus on what the final structure will look like or how traffic will flow. It's very easy to get caught up in this process. But how do you learn best where to locate the project? Does it have sufficient access to transportation, utilities and amenities? Will it be caught up in a building boom that's taking place? Will it be in a good position when construction is slow or will it be too remote? Do the plans account for the piles that will be needed to pass the weight of the structure down into the bedrock due to poor soil conditions? Will grading be problematic because of bedrock too close to the surface?

Bentonville, Arkansas in the U.S. is home to the headquarters of Wal-Mart. Because of the strong growth the company has seen over the past few decades, Bentonville has been something of a boom town, with huge amounts of construction in the area. But when the economic recession hit in 2008, much of that expansion stalled, leaving the appearance of a ghost town. Today, you can drive through miles of farmland dotted by multi-story apartment complexes. Beautiful intersections, sidewalks and crosswalks with lovely landscaping such as you would expect to see in the middle of an upper-class neighbourhood suddenly stop in the middle of an open field. Though some subdivisions are seeing construction again after sitting idle for the better part of a decade, the discordant appearance combining urban and rural life will still remain until the area has caught back up with the prerecession progress.

Phase 2: Development

Once the project is planned, the site will need to be developed to prepare it for construction. But before the first bulldozer is brought onto the job site, more details need to be explored. What are the weather conditions typically like this time of year? If it rains constantly, heavy equipment will either require construction mats or will tear up the soil, creating a mud pit. Heavy rain may stop the project entirely, so knowing what's coming up helps you save money on rental equipment that will sit idle for a week. Is the soil silty, requiring additional erosion control materials and techniques to prevent runoff? Is there a spring that will need to be rerouted or capped to prevent problems with the foundation later in the building's lifespan?

A survey and grading crew go out to a job site to lav out the changes that will need to be made. When the survey crew uses GIS with their equipment, they can be sure they're in the exact location they should be and can note any differences between the plan and the site, bridging the gap between the concept and the reality of the project. The architect or engineers can then make any necessary changes to the plans based on this difference, such as a landslide that will require additional stabilisation. fill or excavation to make the project work. VR headsets can combine with the digital plans, GIS data, and other data sources to create a virtual walk-through of the site, helping the client, planners and construction crews visualise how the project will come together. This, in turn, creates a better understanding of how the different systems will come together.



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Phase 3: Construction

When it's time for the building to go up, the job site will be in full swing. With multiple crews handling multiple areas of expertise, lack of coordination can cause safety problems as well as being costly. When one crew is delayed waiting for material, others are waiting for them to finish so that they can begin their part of the process. This is the time when most project managers are vital to the task. But instead of having to be on site, GIS systems allow remote management of the job site. It allows the manager to plan crew needs and manage the project's workflow. Workflow management allows tasks to be set up for particular areas of the job site, so instead of having to tell the crew where to work next during a delay, they'll already have that information on a mobile device or job site computer. This means less time is wasted and more time is spent moving the project forward.

A new hospital has a parking garage attached, which was originally scheduled for electrical and communications wiring this week. However, one of the main slabs has had a failed concrete strength test and will need to be re-poured. Because this will impact the electrical crew's access to the garage, an on-site worker grabs a VR headset and takes a look at the garage to see if the re-pour will cause problems with accessing the main breaker system. She determines that they'll still have pedestrian access to the breaker boxes, but will not be able to bring a truck up to that location. After a quick check with the project manager's workflow shows that access will be restored within a couple days once the concrete trucks are done, the crew foreman considers the options

Though it can take a little time, education, and work to properly implement, GIS capability is well worth the effort involved. It can provide builders with a wide range of excellent tools to help their construction business save money and reduce waste while providing them with precise information about the project as it rolls forward. By taking advantage of this technology's benefits, construction companies can enjoy better profitability and more time spent doing what they do best – getting the job done.





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JKR: Driving Construction Transformation Through Public Projects Date' Sri Ir Dr Re

The Public Works Department (JKR) has reaffirmed its commitment to spearhead the highest standards of quality and sustainability in construction as part of its overall strategy to realise the goals of the Construction Industry Transformation Programme (CITP) 2016–2020.

"As the main agency responsible for the construction and maintenance of public infrastructure in the country, we aim to spearhead positive change in the local construction industry by encouraging industry players, public and private, to undertake state-ofthe-art construction methodologies. This is also very much in line with the objectives of the CITP, which seeks to transform the construction industry into a modern, highly productive and sustainable sector," said JKR Director-General Dato' Sri Ir Dr Roslan Md Taha.

Speaking at a recent media briefing session, Dato' Sri Roslan said amongst the key initiatives which JKR will be undertaking include the implementation of the use of rating tools such as Quality Assessment System for Construction (QLASSIC) and the Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST); adopting modern technologies and practices such as the Industrialised Building System (IBS) and Building Information Modelling (BIM); and adopting the Malaysian **Civil Engineering Standard Method** of Measurement (MyCESSM) for JKR projects.

He stressed that a directive had been issued in September 2015 to all project implementers in JKR to use pHJKR (JKR's own rating tools) and MyCREST to ensure energy efficiency and sustainable construction to reduce carbon footprints. These initiatives are carried out towards achieving the government's aspirations of reducing carbon emission by 45% by the year 2030. The pHJKR shall be adopted for projects costing RM20 to RM50 million while MyCREST will be for projects costing more than RM50 million. However, project implementers are free to adopt MyCREST, simply because it is more comprehensive where carbon calculations are concerned.

CIDB will be complementing JKR's efforts by providing training and accreditation for its personnel on the use of QLASSIC, MyCREST, IBS and MyCESSM; developing an IBS-specific catalogue; as well as enhancing the BIM library with latest technologies and practices.

Another key highlight of JKR's commitment is the adoption of "Gerbang Nilai," a construction review process that enhances construction quality and productivity levels. A key feature of this review process is that it only allows the construction project to progress to the next stage if all requirements at the current stage are met.

"JKR's commitment to adopt 'Gerbang Nilai' for projects under our supervision is indeed a step in the right direction as we seek to guarantee the highest level of quality of construction for the Rakyat. Contractors who do not meet the required specifications under 'Gerbang Nilai' would be faced with a

Dato' Sri Ir Dr Roslan Md Taha, JKR Director-General

cancellation of their contracts or would have to undergo a strict audit process prior to being granted an extension of time," said Dato' Sri Roslan.

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JKR has been putting forth initiatives to support the CITP since it was introduced in 2015. Notable achievements include:

- 1. Quality, Safety and Professionalism
 - a. QLASSIC tool has been adopted for 10 pilot projects under JKR
 - b. Occupational Safety & Health (OSH) specifications have been implemented in the tender process for engineering construction projects under JKR
 - c. Study on the implementation of "Gerbang Nilai" has been completed and adopted for 3 pilot projects under JKR
- 2. Environmental Sustainability
 - a. MyCREST has been adopted for 21 projects under JKR including the Menara Kerja Raya, the Malaysian GreenTech Corporation Building and the Energy Commission Building

3. Productivity

- a. 23/51 of JKR projects tendered in 2016 have adopted IBS
- Additional 44/71 of JKR projects have adopted IBS in 2017
- c. 120 Pre-Approved Plans (PAPs) have been completed by JKR
- 4. Internationalisation
 - a. 2 projects under JKR have adopted MyCESSM
 - b. Director-General of JKR has issued a circular on MyCESSM to all JKR Offices at National, State and District Levels

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The Life of an Environmental Officer

Whether it's rain or shine, environmental officers perform their duties. And their efforts are often unseen and therefore unacknowledged by the public. Nevertheless, the impact on our environment would be greater without their efforts. BINA MAMPAN caught up with Farrah Aina binti Haznidan, senior environmental officer (EO), to peek into the life of an EO.

> Farrah Aina binti Haznidan, Senior Environmental Officer, MMC-Gamuda KVMRT (T) Sdn Bhd

Despite growing up in Shah Alam, a highly industrialised area, Farrah Aina binti Haznidan's childhood was filled with memories of nature.

"When I was a small kid, 7 or 8 years old, my mom used to take me to the recreational park in Ulu Yam for camping. A few years back, I saw that the environment has changed, especially from what I've seen at the park at Ulu Yam. The water isn't as clear as it was during my childhood," Farrah noted.

Holding a Bachelor of Science in Environmental Technology from Universiti Teknologi Mara (UiTM), she considers herself lucky to have landed a job as an environmental officer at the joint venture company, nearly immediately after graduation.

Few know what an environmental officer's job entails. Farrah had to liken her role to that of an engineer's, to help her friends and family understand the nuances of her chosen career. "When our friends and relatives ask us what an environmental officer is, they don't know, so we just say environmental engineer when they ask," she admits.

Though individuals aspiring to work as EOs in other companies need not necessarily possess degrees in environmental studies, the requirements for the KVMRT project are more stringent, as Farrah explains, "It's stated in the contract, that EOs must have a certified degree in environmental management, environmental science, or environmental technology and field experience of 5 years," adding that the company does accept interns from other backgrounds who major in environmental studies.

Aside from these prerequisites, EOs are required to attend environmental competency programmes by the Department of Environment (DoE). MMC-Gamuda, in particular, requires its employees to participate in the Construction Skills Certification Scheme, a competency training programme, to ensure that they possess the required knowledge and to reduce all risks to the environment as well as their safety.

An EO's day at work

As they are based on the requirements set by the DoE, the responsibilities of EOs vary from project to project and are laid out in detail in the Detailed Environmental Impact Assessment report. These responsibilities include monitoring the construction and functionality of the Best Management Practices such as the silt traps, perimeter drains, check dams and so on. EOs also visit the site daily to measure the rainfall and record the data in their logbooks. These site inspections usually take 2 hours.

"If the rainfall exceeds 12.5 mm, that is the trigger point for the EO to visit the site to conduct an inspection of best management practices (BMPs) and to report to DoE in their online system," Farrah explains.



"Yes, when others are running for shelter, the EO will walk in the rain and monitor the best management practices." - Farrah

Aside from these daily inspections, EOs also carry out formal inspections weekly with the Operations Team and attend onsite meetings where they brief and advise members of the Operation Team on the issues identified during the environmental inspection. As a senior environmental officer, Farrah also supervises several EOs working on 4 sites in the KVMRT project from KLCC to Desa Waterpark.

When asked about common mistakes made by EOs, Farrah clarifies, "The mistakes are not just common among the newcomers but it can be by the seniors as well when they are not focused while carrying out their duty. One of it is lacking thorough inspection and reporting, as some of the environmental aspects can be overlooked. There are no easy ways of carrying out inspection but to walk and monitor.

"In terms of giving advice, due to lack of knowledge and experience, the EO could at some point give immature pieces of advice that are not practical and are ineffective uses of resources. If an EO carries out their assigned task irresponsibly, the consequences will cause the risk of environmental pollution to be increased and jeopardise the compliance of environmental requirements."

A thrilling role

As Farrah guides us on a tour of the Bandar Malaysia North MRT Station construction site. it's clear that this career brings joy to her. Pointing to the water in the silt trap, she says, "You can see this is very silted and very muddy." Then, she pulls up a hose where clean water gushes out, "The treated water is very clean. So basically, this is what we do to monitor whether our water treatment plant and silt traps are functioning." She plunges a total suspended solids meter into a cup of treated water and we all watch as 0 mg/litre appears on the screen. And when the same device is submerged in the water in the silt trap, the meter's screen displays \rightarrow 30,000 mg/litre.

"Only with the water treatment plant, can we achieve purity up to that level," she says, referring to the 0-mg/litre achievement.

Her face is flush with happiness as she points out the silt trap and silt fences. "I don't see all these soil and dirt as gritty and dirty. It's exciting to me," she added.

To her, the most memorable incident occurred when she had the opportunity of seeing the Tunnel Boring Machine break through the retaining wall for the Sungai Buloh-Kajang line. "It was thrilling and exciting and a historic event. Such opportunities are rare. The only other incident was the SMART tunnel, but I wasn't in the industry then. Seeing the station completed and finally operating a few years later is very satisfying," she reminisces.

As thrilling as the role of an EO is to her, it does present a set of challenges, as she explains, "The biggest challenge that we faced is to ensure that progress goes along with the set requirements. This will need the EOs to work and communicate with various teams such as operations, contract and commercial, the external parties, the appointed DoE auditors, and the authorities. Some of the packages have been awarded to international contractors such as the China Harbour Engineering Company and Nanyang Tunnel Engineering. It's a challenge to ensure their management understands the local requirements."

Rainy days and stifling heat are sources of frustration to many people, but not to Farrah, who says, "Most of the time, we are working outdoors – whether it is rain or shine or even during the haze. The best time to monitor and see whether the best management practices are functioning well is when it rains. Yes, when others are running for shelter, the EO will walk in the rain and monitor the BMPs."

What traits do EOs need to possess?

"Getting EOs who are high achievers in their studies is a plus point of course, but what we are looking at mainly, is someone with a good attitude and aptitude. Good communication skills and survival skills are also important. They must be able to work independently and have critical thinking skills," Farrah explains, adding, "Being a team player is also important. Basically, we are one unit. It is very important

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for us to work as a team, because all the requirements and all the documents prepared require coordination to ensure that the report is submitted on time."

What remuneration can an entry-level EO expect?

The package rewarded to an entry-level EO is like any other executive level. The current market offers a salary in the range of RM2,500 to RM3,000 a month. However, the benefits they can garner from the career platform, such as the mega projects, are enormous. Savvy EOs can grasp the opportunity in front of them to enhance their future prospects.

What would the career path of an EO look like?

Environmental officers can advance their careers in the construction industry and other environmentimpacting industries. They can work as environmental consultants, chemists, environmental coordinators, as well as lecturers. Whatever career the EOs dive into, the most important thing is they have great determination and are passionate towards their career. Only then can they work to keep the earth green and healthy for our future generations.









As Farrah guides the team on a tour of the Bandar Malaysia North MRT Station construction site, it's clear that this career brings joy to her

Financing for Sustainable Development Is Growing

Sustainability is no longer just a trendy buzzword that is thrown around. From the global directives of the United Nations (UN) to more specific and country-wide mandates, pairing sustainability, construction and finance together is no longer an unheard-of proposition. In fact, it is becoming an important factor in construction financing at all levels.

Financial Considerations for Sustainable Construction

The concerns of sustainable construction extend beyond ringgit and sen, as well as profitability and risk. Environmental impact is now a consideration in securing financing for construction projects across all sectors increasingly, around the world. Across the globe, government entities are leading the way in offering investment capital for those projects that support sustainable construction. These are opening up avenues that allow private financing options to expand and deliver the funding needed for sustainable development.

Within the European Union, for example, there are a number of instruments that can be used to finance sustainable construction projects. In some instances, the distribution of funds is tied to the achievement of specific performance goals within an environmental framework. If these parameters are not met, further disbursement of funds could be delayed.

Energy performance contracting (EPC) provides funding for retrofitting a building for energy savings. The initial investment is typically offered by a bank or private company and is expected to be recouped in the form of energy savings over a period of years. Projects that pair the public sector with private businesses harness the flexibility of both to achieve the project's objectives. Because the focus is on risk management, the allocation of these risks can vary depending on the scope of the project. In some instances, public authorities simply oversee the project, leaving it open for private financing companies to invest in sustainable development and diversify their portfolios.

Sustainable construction and its target issues

Sustainable construction is a complex concept that comprises different aspects. To streamline understanding and application, it is necessary to compile a framework from which to work. The following target issues provide a solid basis for considering a project worthy of sustainable financing:

Innovating with transferability in mind

To qualify as sustainable, construction projects need to demonstrate that they are innovative regarding the use of design, structure, methodology, integration of materials, mechanical systems and more. These must tie in seamlessly with construction technologies that streamline building processes, maintenance and operations. Innovations and advancements in landscape design, architecture, environmental engineering and production must also be transferable to other applications.

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Knowledge dissemination regarding education, project documentation and training is vital to the transferability aspect of innovation. In addition, methods of monitoring – both for the long and short term – must be built in to allow for ease of evaluating the success of goals, expectations and standards.

Environmental performance and resource management

Adequately managing resources and the environmental performance of sustainable construction projects is necessary to avoid creating buildings that are a drain on the earth and its peoples. Throughout the entire lifecycle, sustainable projects must demonstrate the sensible management and use of natural resources, materials and energy by considering their ability to ebb and flow.

Developing a footprint that has a minimal effect on the planet and the surrounding natural landscape, including the reclaiming of water and land is vital to the success of sustainable construction. Using sources of renewable energy with a focus on the reduction of carbon dioxide emissions and toxins is required. The deployment of materials must focus on using existing stocks, reducing waste and resilient materials while integrating technologies that are environmentally sound, robust and smart.

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Ethics and sustainability

The social impact of sustainable construction cannot be overlooked or dismissed. All projects must be inclusive in terms of each phase of development including planning, building and servicing to ensure that ethical standards are met and that communities experience a positive impact. Projects must specifically address these issues during the proposal phase.

The participation of shareholders across all levels of involvement – clients, non-governmental agencies, users, local authorities and neighbourhood organisations, for example – must be encouraged in order to ensure compliance with ethical standards. The strengthening and empowerment of the community in the form of elements such as adequate benefits, fair compensation, gender equality and safety is vital to support the area's values.

Aesthetic value and impact

Quality in the form of innovative architecture as it pertains to the culture of the area is a significant portion of sustainable construction. Its design should focus on making a lasting contribution to the cultural, physical and human environment that is positive and welcomed.

This means improving on the existing environment – whether it is natural or built – to deliver an integrated interdependence of architecture with the infrastructure, landscape, cultural elements and more. In many cases, this means using the existing building stock through reuse efforts, restoration or remodelling. Innovative functionality, long-term versatility, short-term adaptability and more require strategies that are inventive, innovative and that push the boundaries that were previously held.

Economically Viable

No discussion of sustainable construction projects is complete without addressing their need to deliver economic feasibility in terms of managing and effectively channelling the flow of finances so that a meaningful economy is supported and promoted at every step. These must be able to comply with the construction project's demand throughout its lifespan.

Successful sustainable construction projects must be smoothly integrated into the larger framework of regional, local and global economies with the result being a positive impact on both society and the environment. Any sources of funding that fuel sustainable construction projects – as well as any profits that are realised – must be both transparent and legitimate.

The return on investment in regard to the project must focus on affordability in terms of the projected operating costs when figured over the lifetime of the building. Adaptability is a cornerstone of a project's economic viability. To meet the definition of sustainable construction, the project must include the flexibility and versatility to adapt to the different needs of the community in the event of a change of ownership, fluctuations in economics, changes in regulations, more stringent laws and other factors that are likely to occur at some point during the building's lifetime.

Robust economic models that take the probable costs of these adaptations must be implemented with innovative strategies built into the development of the project. Otherwise, meeting the changing needs of the community in the future could render the building practically useless. This framework must be in place prior to the approval of any sustainable construction project.



Why sustainability must be taken into consideration in construction financing

Structures across the globe have the capacity to make a significant contribution to the future of a more sustainable planet. The Organisation for Economic Cooperation and Development (OECD) postulates that the buildings within those countries that are developed comprise over 40 percent of the energy used over the course of their lifetimes. This figure is incorporating elements such as operation, construction, raw materials production, maintenance and decommissioning.

Sustainable construction and urban population growth

For the first time in history, more than half of the earth's population is housed in urban centres. Focusing on sustainable buildings to address their needs is clearly ideal for both the earth and its people as well. With the explosive population growth that equates to an additional one million people that are added each week, time is of the essence. The time to visualise and apply concepts and ideas that support and optimise sustainable construction is now.

How to build a future that is sustainable

Sustainable construction is a concept that – when properly applied – uses the resources available now to support the needs of the planet and its people now and long into the



future. The key is to develop concepts that address the present without compromising the future. With the plethora of technologically-based innovations and resources that are available today and being developed in the future, the possibility and future of this concept is bright.

Financing and sustainability

Given the amount of innovation involved and the fact that new components, materials and products need to be developed to address sustainability, the initial investment for such construction projects tends to be higher than those developed using conventional methods. There are various reasons for this increase in costs such as the following:

- Third-party certification costs to ensure compliance with the applicable environmental standards
- More complex design work involving the incorporation of innovative systems such as renewable energy, cooling or heating
- Minimising the construction process' impact on the environment results in specialised processes such as noise reduction,



resource and waste management and a reduction in impact to surrounding areas including the foliage

- Increased material costs due to concepts such as an improved standard of insulation
- More complex contractual elements that could include items like indemnities, working conditions, insurance, intellectual property and other factors

The payoff for using sustainable building practices

Though the initial investment is likely to be higher than that for conventional construction projects, the costs of sustainably constructed buildings are projected to be lower over their lifetimes. This is true when it comes to figuring the cost of a building over its lifecycle as well as those lifetime costs associated with its water



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and energy consumption. Another element that must be considered when addressing the payoff between sustainable construction and financing is its effect on compliance with any environmental legislation of the future. Retrofitting buildings to meet such mandates is notoriously more expensive when compared to building those elements into the construction project at its outset. This is why sustainability is now a major consideration when it comes to financing new construction projects.





- INDUSTRY TRENDS

Infrastructure construction will continue to be the largest growth segment

he global construction industry has three basic classifications of construction types: commercial, residential, and infrastructure. Infrastructure has long been the growth leader and forecasters are saying that 2017 will be no different. Infrastructure is expected to continue as the global industry's largest segment. This is due, at least in part, to emerging economies such as India and China experiencing an increasing rate of urbanisation as well as the vast number of new cities, primarily "mega cities" (cities with a population exceeding 10 million) that are being developed in these and other areas. The North American and APAC construction markets are expected to experience solid growth due to the infrastructural development. Technology will provide better monitoring of infrastructure for corrective maintenance and predictive strategies with an emphasis on new technologies that allow old or outdated infrastructure and buildings to be reinvented.

Renewable energy consumption will steadily increase, exceeding growth of primary energy

here is an overall, global demand for higher standards for sustainable living. As these countries grow and the population increases, there will be an increasing demand - and an increasing responsibility – for sustainability and public health. Issues at the forefront of this movement include better and more sanitary waste management as well as good, clean drinking water. As populations age, there will be an increased need for global health services to take care of them. As the mega cities are created, there will be an increased demand for better, more efficient, more affordable energy options with an emphasis on green or environmentally friendly choices. There are many considerations for a growing, expanding, evolving world, and energy is at the core. Renewable energy consumption will grow at a 30% increase by 2030, surpassing the growth of primary energy. Construction companies and their partners will have to take deliberate, calculated steps to ensure that these needs are met.

The demand for green construction will continue to increase

nvironmentally friendly, or "green," products and services are increasing in popularity across all sectors, and the movement is gaining a great deal of traction in the construction sector. The demand for green construction is steadily increasing as companies seek to reduce their carbon footprint. They are turning to technological strategies such as building information systems that increase the efficiency of building management and employing bridge lock-up device systems to enhance and extend the lifespan of the structure. Fibre-reinforced polymer composite is being used on aging structures to rehabilitate them. Renewable energy will also be a significant consideration as priorities swing in the direction of sustainable living. This has been a gradual shift in recent years as companies have made the decision to move to kinder, earth-friendly options that emphasise less waste. This trend is expected to continue and pick up speed throughout 2017 as more technologies are created to support it.

Growth in emerging markets and developed countries will increase exponentially

By 2020, construction in emerging markets is expected to reach \$6.7 trillion (RM29.8 trillion), double in size and scope, and make up approximately 55 percent of the global construction yield. Developed countries are expected to see a growth of around 36% by the end of that time. Emerging markets such as Eastern Europe, Africa, the Middle East, Latin America and Asia are expected to see strong, consistent growth due to renewal of infrastructure, globalisation and urbanisation, as well as meeting the needs of megacities in development. In fact, these emerging economies are where the construction industry is expected to see the bulk of its growth. Construction players can strengthen this growth by partnering with these markets, building alliances and financing infrastructure with infrastructure funds and investment banks.

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Sustainable Construction Technologies from Malaysia for the World

n many developing countries, progress often happens at the cost of the environment. But in Malaysia, a different approach has been taken. With the construction industry providing a constant 3-5% of the economy every year for the past two decades, the country has seen the mistakes made by developing countries around the world and actively chosen to take a different approach. With a strong focus on environmental sustainability, the construction sector in Malaysia has many unique facets to it that are now being used around the world in the form of best practices, technology, and materials. Here, we look at some of the more prominent aspects of Malaysia's sustainable construction vision that are beginning to spread beyond the country's borders.

Creating Sustainable Practices in a Developing Country

As a country grows, it requires more infrastructure, residential structures, and industrial buildings to maintain and continue that level of growth, and Malaysia is no exception to that process. Because construction of these areas requires a significant amount of materials over 50% of all natural resources extracted from the earth - it can have a strong impact on the natural resources in a country. Many developing countries have tended to favour an approach of, "develop now, sustain later," but in today's growing world, this approach is outdated and must be changed. Malaysia has paid attention to the impact construction can have on natural resources and has, in turn, developed and promoted a wide range of sustainable construction processes that are now being adopted by other developing countries.

Keeping Construction Lean and Sustainable in Malaysia

Another principle of the construction industry is lean construction, focusing on minimising waste during the construction process. Because it focuses on reducing waste, it also fits with many of the same goals as sustainable construction. By reducing waste, the project costs less and has a smaller impact on the environment, making it easier for building funds to go further than in the past. As a developing country, Malaysia has provided leadership in lean sustainable construction to other countries through academic papers and research.

Leading by Example with the Green Building Index

Though there are other sustainable development and construction rating systems available, the climate in Malaysia provides different challenges than rating systems developed in other countries. For that reason, the Green Building Index was developed to provide a benchmark for sustainability in hot, humid, tropical climates such as that found in Malaysia. As other countries in the equatorial regions begin to change their focus from rapid development to sustainable construction, the Green Building Index has seen significant growth, as the rating system better deals with those countries' unique challenges. Though Singapore has developed the GREENMARK rating system, it is much more narrowly focused on the needs of Singapore, not tropical countries as a whole. By comparison, the Green Building Index is more broadly focused, with an eye towards international standards, including the World Green Building Council's standards.

Creating Sustainability in Industrialised Building Systems

As countries go through the development process, industry begins to take hold and grow. However, in many developing countries, industrial development can cause significant issues with sustainability as businesses take advantages of under-developed regulations. Creating sustainability in an industrial building can be challenging, but is well worth the rewards of a lower environmental impact and lower maintenance and utility costs. In Malaysia, there is a culture of sustainability in the construction industry, focusing on reducing waste, using sustainable building materials, and providing better logistical options while providing economic sustainability for the business. As regional and global countries are developing, the influence of Malaysia's sustainability focus is being exported for industrial projects around the world.

Lead from the Front: Government Influence on Sustainability

Government plays a strong role in how a country's development happens. From codes and education to incentives and taxes, there is a wide range of tools available to virtually every government around the world that can help promote sustainability and a culture of green construction. Malaysia provides exceptional leadership, helping ensure that the country's development is completed in a sustainable fashion. This is accomplished through a wide range of channels in the Malaysian government. Tun Abdullah bin Haji Ahmad Badawi, the country's fifth prime minister, began to focus on sustainability in the country and encouraged agencies across the government to take up the cause and promote it to create a more sustainable country, a long-term vision that Malaysia still benefits from today.

Plan to Have a Plan

Another initiative from the Malaysian government is the developmental Malaysia Plans. Focused on promoting economic development in the country, this series of plans often has a strong impact on not only developing the economy but also how it is developed. Specifically, the push by Prime Minister Badawi during his time in office from 2003 to 2009 for developing Malaysia in a sustainable manner has led to the inclusion of sustainable construction initiatives in every Malaysia Plan since the Eighth. As the country works towards the end of the Eleventh Malaysia Plan, great strides have been made to continue developing the country with an eye towards longterm sustainability. This impacts everything from what areas are focused on in the current plan to overall building efficiency that helps

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reduce energy and resource waste. With the Twelfth Malaysia Plan currently on the drawing board, it's expected that it will continue many areas of development in the country, including water supply, efficiency, and infrastructure.

CIDB's Impact on Sustainable Construction

Malaysia also leads the region in innovation in sustainable construction. With a wide range of resources and research coming from the National Institute of Valuation Malaysia, the Malaysian Science and Technology Information Centre, the Science University of Malaysia, University Technology of Mara, and the National University of Malaysia, this information must be disseminated to the industry. With the push for a more sustainable Malaysia, the Construction Industry Development Board (CIDB) has been leading from the front to provide development, improvement, and expansion of the construction industry in Malaysia. With environmental sustainability being the top issue facing the construction industry, CIDB plays an important role in getting information and best practices to Malaysia's construction industry, which then influence the world at large as new practices, knowledge, technology and materials are developed.

Creating a Centre for Sustainable Construction: MAMPAN

But what's the best way to distribute the new information once it's been developed by CIDB? The Sustainable Construction Excellence Centre, or MAMPAN, is Malaysia's solution to sharing its advances in sustainable construction with the country, the construction industry and the world

as a whole. Providing an operational model to develop, promote, and implement new innovations in green construction, MAMPAN is focused on making Malaysia a regional leader in sustainable construction in 2017. The centre's focus for 2018–2020 will be on promoting compliance and participation in sustainable construction practices while focusing post-2020 on raising the perception of sustainable construction not only in Malaysia, but also in the rest of the world. One resource being used both in Malaysia and around the world is MAMPAN's Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST), a rating tool to help assess sustainability in planning, construction, operation and maintenance of structures. The tool also helps quantify the carbon emissions during every stage of the building's lifecycle and looks at the socio-economic impact of the structure, including such details



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as reduced lifecycle costs and lower damages from floods and natural disasters. Much like the Green Building Index, MyCREST will provide a rating system focused on carbon emissions and environmental sustainability for the world.

Outside Perception of MAMPAN

By providing a strong platform from which Malaysia's role in world construction standard development can be addressed, MAMPAN is promoting Malaysia's influence in sustainable construction around the globe. But how effective can MAMPAN be in the sustainable construction industry and the international community? Prof Ir Dr Zuhairi bin Abd. Hamid of the **Construction Research Institute** of Malaysia had this to say about the centre, "MAMPAN will be the catalyst in transforming the mindsets of industry players to

prioritise sustainability, from the way construction methods are carried out down to the type of materials used. We aim to make sustainable construction mandatory by 2020, starting with government projects valued at RM100 million and above. This will come after we have set the standards and requirements, beginning with the development of sustainable rating tools for buildings and infrastructure." The focus of MAMPAN goes well beyond the borders of Malaysia to influence the initiatives and focus of other countries, whether undeveloped. developing or developed, across the globe.

Malaysia's Construction Industry in the Future

But where will Malaysia go in the future with its strong focus on sustainable development? The growing economy and worldwide recession recovery mean that finding skilled labour is becoming difficult. In turn, a lack of skilled labour can lead to construction delays and cost overruns that make a project less sustainable as it requires more money and less environmentallyfriendly materials to complete the project in a timelier and less expensive manner.

Our world's burgeoning population demands that future development and construction be approached with an eye towards superior sustainability and environmental stewardship. We can no longer afford to ignore the impact we have on our world, and Malaysia's green construction leadership and advancements provide the rest of the world with exceptional tools to help with this process. With Malaysia's strong focus on sustainable construction, it's easy to see why it's becoming a leader in this aspect and why its influence is spreading well beyond its borders.



is just a CLICK, TAP or TOUCH away.

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The Malaysian Construction Industry Excellence Awards 2017

excellence has no limitations

THE ACCOLADE FOR EXCELLENCE



CIDB (#)

THE PROMINENT PLAYER AWARD

> YBhg. Datuk Azlan Abdul Karim Putrajaya Holdings Sdn Bhd

THE CEO OF THE YEAR AWARD

> Dato' Ir. Dr. Gue See Sew G&P Professionals Sdn Bhd

THE BUILDER OF THE YEAR AWARD

- > Ahmad Zaki Sdn Bhd
- THE CONSTRUCTION LEADING LADY AWARD
- > Dato' Ar. Nur Haizi Abdul Hai TRC Synergy Berhad
- THE INTERNATIONAL ACHIEVEMENT AWARD
- Eversendai Corporation Berhad

THE IBS AWARD

- > Seri Kasturi Apartment, Setia Alam, Selangor Setia Precast Sdn Bhd
- **Rapid Project Labour Camp and Temporary** Construction Facilities, Pengerang, Johor Mudajaya Corporation Berhad

THE INNOVATION AWARD

- Variable Density Tunneling Technique (VDTT) MMC Gamuda KVMRT (T) Sdn Bhd
 - THE GREEN CONSTRUCTION AWARD
- > Menara Kerja Raya Kementerian Kerja Raya Ahmad Zaki Sdn Bhd
- Caffe Diem @ Pekan Cina (Special Mention) **Rik Construction**

THE HEALTH AND SAFETY AWARD

Malaysian Anti-Corruption Commision (SPRM) Headquarters Pembinaan Mitraiava Sdn Bhd

THE BEST CONTRACTOR AWARDS

- Grade G1 Emartech Resources Sdn Bhd
 - Grade G
 - Putek Niaga Enterprise
- Ad Dimension Sdn Bhd Grade G4
- Ambangjitu Tech Sdn Bhd
- Grade G4 (Special Mention) Siti Solimah Construction Sdn Bhd Grade G5
- **Bina Perkasa Trading**
- Grade G5 (Special Mention) **Rik Construction**

THE BEST PROJECT AWARDS

- BUILDING PROJECTS
- Small Project > Masjid Seremban 2 FNA Builders & Services Sdn Bhd
- Small Project (Special Mention) > Quarters Jabatan Penjara, Seremban
- Mafcon Enterprise Medium Project > Upgrading KOMTAR, Pulau Pinang Alam Langkawi Sdn Bhd
- Major Project > Menara Kerja Raya,
- Kementerian Kerja Raya Ahmad Zaki Sdn Bho
- INFRASTRUCTURE PROJECTS
- Small Project Batu 6 Bridge, Gerik, Perak DURA Technology Sdn Bhd Medium Project
- Central Spine Road Package 3 Gua Musang, Kelantan to Kg. Relong, Pahang, Seksyen 3H Skop Tambahan Kg. Kechur to Kg. Seberang Jelai Pembinaan Kery Sdn Bhd
- Major Project KVMRT Line 1 (Phase 1): Sungai Buloh-Semantan MMC-Gamuda KVMRT Sdn Bhd
- Major Project (Special Mention) **Bukit Kuang Bridge,** Kemaman, Terengganu Cergas Murni Sdn Bhd

& Thank you! PANEL JUDGES

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