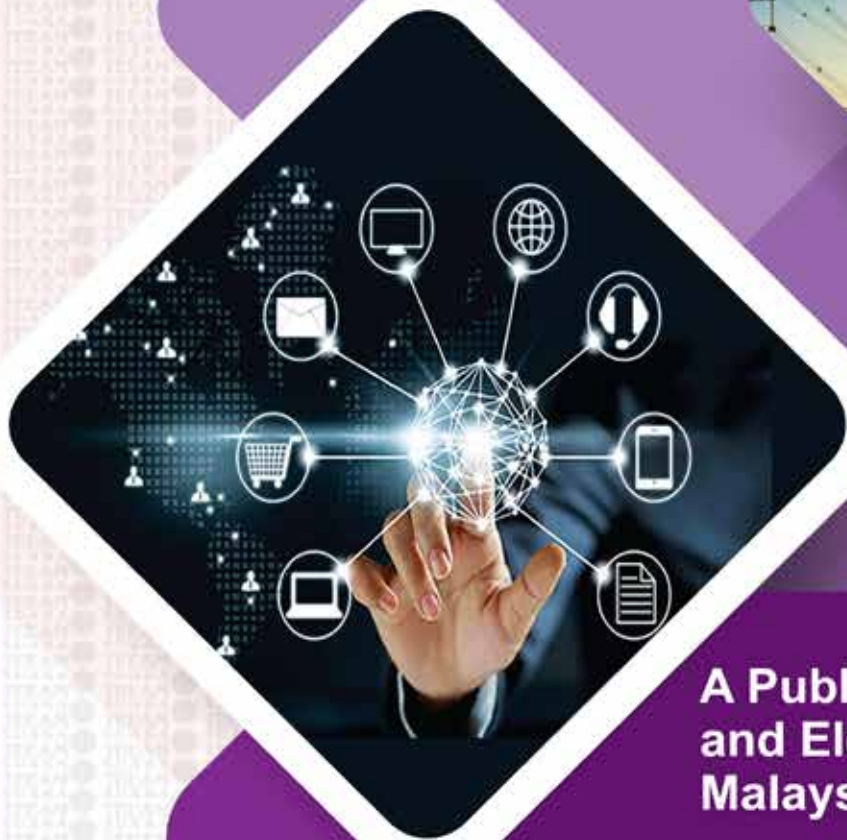




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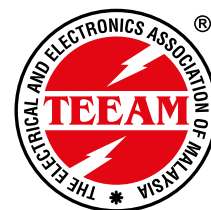
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Plugs, Socket-Outlets for Industrial Purposes

LS – TYPE Plugs and Socket-Outlets for Entertainment



Plugs



Couplers

Inclined flush mounting sockets - Watertight IP67



PEW...PI 16A-32A 63A-125A

Couplers - Watertight IP66/IP67



16A-32A

Wall-mounting plugs - Watertight IP67



PEW...SM 63A

Plugs – Watertight IP66/IP67



PEW...SV 16A – 32A

Interlocked switched socket-outlets with screw type fuse carrier aluminium enclosure – splashproof IP55



(PK...PB5 125A)

Interlocked Switched Socket-Outlets



TM...SP

Plugs - Low voltage from 50V to 690V

IP44



PE...PP 16A-32A

IP67



Couplers 16A-32A



PE...PQ 16A-32A



SIPW...SV



PE...SV 16A-32A



PEW...PP 16A-32A



Multipole Connectors for Industrial Purposes

C-Type



IP Enclosure C-Type



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Hoods with 1 level



CNE-CSE 16 Poles



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MIXO modular units



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CT – CTS 64 Poles



Terminal blocks inserts screw terminal connection

CP 6 Poles 35A-400/690V



Inserts, screw terminal connection

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Inserts, 4 poles + connection with spring terminal

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From The Editor's Desk



The Malaysian Institute of Economic Research (MIER) forecasts that the Malaysian economy, as measured by the Gross Domestic Product (GDP), will expand moderately within the range of 4.3% to 4.6% in 2024, driven by resilient domestic demand and stable labour market conditions.

Other than Technical Talks, there had been a few Technical Visits in TEEAM's list of activities. We look forward to a greater participation from members to capitalise on the economic opportunities, amongst others.

We have an article on Solar PV and Battery Storage which can potentially be an important area to explore and focus in the near future.

With the ever-increasing number of EVs on the road, we had seen fit to proactively organise our 1st EV-centric Technical Talk for the year, on 13 March 2024, regarding EV's challenges and exciting opportunities.

TEEAM will be the Grand Host for the upcoming AFEEC & FAPECA Conference & Meetings 2024. It will be held from 26 to 28 June at the Kuala Lumpur Convention Centre. The official theme is Energy Transition: Pathway to Net Zero. We hope that TEEAM's esteemed members will generously offer their Sponsorships for this exciting industry-based event – organised by TEEAM Malaysia this time around. We also sincerely believe that all our generous sponsors will tremendously benefit from this June event on a win-win basis!

Here's wishing the Organising Committee and TEEAM a very successful event!

Regards,

Ir. Chew Shee Fuee, KMN
Editor
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Courtesy Visit from the Trade Representation of the Russian Federation in Malaysia

TEEAM received a Courtesy Visit from the Trade Representation of the Russian Federation in Malaysia, on 27 March 2024. The Delegation was led by Mr. Nikita Ponomarenko (Trade Representative) and he was accompanied by his Deputy, Mr. Maksim Sokolov, Mr. Rodion Gurkov (Trade Advisor) and Mr. Anton Toschakov (Digital Attache). The main goal of the visiting Russian Diplomatic Mission is to develop economic relations between Russia and Malaysia, promoting trade co-operation, including digital economy and E&E, as well as attracting bi-lateral investments and technologies.

They were joined by Aquarius Company, a leading Russian IT company in the field of E&E production, whose Representatives were also visiting Malaysia. Representing Aquarius were Mr. Andrey Andrianov (Vice President for Strategic Development), Mr. Andrey Shamshurin (Vice President for M&A) and Mr. Vitaly Bogdanov (Director for Innovation Development).

On hand to receive the visiting guests from TEEAM were Ir. Chang Yew Cheong (President), Mr. Suresh Kumar Gorasia

(Past President) and Secretariat Staff, Ms. Winnie Khong and Ms. Thila Sevellingham. Guest, Mr. Kesava Voodi from Global Digital Solutions, also joined the meeting.

The Russian Trade Office in Malaysia acknowledges that TEEAM is the leading Association in Malaysia for E&E Development and sees significant potential for co-operation in this vital area. They looked forward to establishing mutual working contacts, exchange views on existing experiences of the E&E industry and outline possible steps for further win-win co-operation. Aquarius is interested in business co-operation with Malaysian partners to co-develop Micro-electronics Chips, Embedded Software, Tablets, Laptops, Personal Computers, Smartphones and Servers.

It was a very fruitful sharing session. The esteemed Russian Diplomatic Mission and Aquarius looked forward to pro-actively establishing business co-operation in the near future. This is great news and indeed augurs well for the E&E industry of both nations!

Snapshots





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Power Up for ENERtec Asia 2024

This upcoming exciting event, to be co-hosted by The Electrical and Electronics Association of Malaysia (TEEAM), is well-poised to Charge Forward for Greater Possibilities in the Energy arena. ENERtec Asia 2024 is South-east Asia's Premier Exhibition and Conference with its forward-looking theme of Empowering Energy Transition and Technology. Aptly touted as the Pinnacle of Energy Events in Asia, this electrifying and exciting ENERtec Asia 2024 edition is a highly-anticipated industry event, featuring an impressive line-up of leading Energy Players, Sustainable Energy Solutions, and an extensive Knowledge-sharing Hub.

Join us as we collectively shape a Greener and More Sustainable tomorrow for everyone. Register today and come join us at the world-class Kuala Lumpur Convention Centre (KLCC) from 26 to 28 June 2024 – and bountifully reap the fruits of win-win Business-Matchings and Smart Partnerships!

Pre-Register Today: bit.ly/registerENERtec
Exhibition space enquiry : thila@teeam.org.my

About ENERtec Asia

After two decades of overwhelming success, the ASEAN M&E Trade Show has been transformed with a renewed and dynamic identity re-branding as ENERtec Asia. It will cover three Premier Segments, namely, TENAGA (Renewable Energy & Cleantech), REVAC (Energy Efficiency & De-carbonisation) and an exciting NEW segment -- BATTERY & EV Tech (Energy Storage & EV Technology and Solutions). This spectacular and grand ENERtec Asia 2024 is proudly introduced exclusively by Informa Markets, co-hosted by TEEAM and held in smart partnership with EIC (Energy Industries Council) of global reach.

Do not miss out on this business opportunities'-galore master event vis-à-vis its 20 years of stellar success!

Successful Roadshows

Thank you for the overwhelming support from the industry at the ENERtec Asia 2024 Roadshow Series. The resounding success of the three Roadshows has sparked our excitement for what's coming ahead. The conversation driving the energy transition in the region continues at the WATT'S NEXT Hub @ ENERtec Asia – get ready to be empowered at this dynamic knowledge hub where energy's future takes centre stage! The three Roadshows were successfully held on April 26 at the Sheraton Hotel in Petaling Jaya, May 9 at the Amari Spice Hotel in Penang and May 16 at St. Giles Southkey in Johor Bahru.

Some of the key highlights at the Roadshows were Energy Transition policies, direction of Renewable Energy development; Government Incentives on Renewable Energy & Energy Efficiency adoptions; Industrial Green Transition; and Malaysia's Electric Vehicle Industry. The EIC also shared the regionally-planned and finalised energy infrastructure projects.

See you soon at ENERtec Asia 2024!



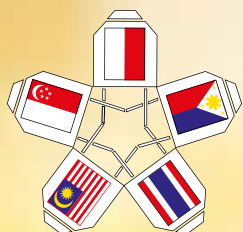
Roadshow in Klang Valley.



Roadshow in Penang.



Roadshow in Johor Bahru.



AFEEC-FAPECA Conference & Meetings 2024



26 to 28 June 2024
Kuala Lumpur Convention Centre, Malaysia

An Invitation For Sponsorship

TEEAM is greatly honoured to host the forthcoming 2024 Conference and Meetings of the ASEAN Federation of Electrical Engineering Contractors (AFEEC) and the Federation of Asian Pacific Electrical Contractors Associations (FAPECA) in Malaysia. This industry-centric AFEEC-FAPECA Grand Event will be held from 26 to 28 June 2024 at the Kuala Lumpur Convention Centre (KLCC), in conjunction with the ENERtec Asia 2024 Exhibition.

AFEEC comprises the five ASEAN Electrical Industry Associations from Malaysia, Indonesia, Philippines, Singapore and Thailand. As a Non-Governmental Organisation (NGO) officially recognised and affiliated to ASEAN (Association of South-East Asian Nations), AFEEC looks forward to the standardisation of Electrical Engineering contracting practices in the five ASEAN member countries and work towards a higher level of professionalism of the Electrical Engineering contracting industry. AFEEC in a broader spectrum, is a member of FAPECA. Its membership comprises members from AFEEC and the Electrical Associations of South Korea, Hong Kong, Taiwan, Australia and USA.

This year's Conference Theme is "Energy Transition – Path to Net Zero", which will be held on 27 June 2024 at 9.00 am at KLCC. TEEAM will be cordially hosting a Welcome Dinner, a Farewell Dinner and a Golf Game as well. This Grand Event provides excellent networking opportunities for Malaysian business entities and also for all esteemed Delegates hailing from the various countries.

It is expected to draw active participation from some 200 Delegates from 8 Electrical Contractors Associations, including the Association of Indonesia Electrical and Mechanical Contractors (AKLI), Korea Electrical Contractors Association (KECA), Singapore Electrical Contractors and Licensed Electrical Workers Association (SECA), Society of Philippines Electrical Contractors & Suppliers (SPECS), Taiwan Electrical Contractors Association (TECA), Hong Kong Electrical Contractors Association (HKECA), Thai Electrical & Mechanical Contractors Association (TEMCA) and TEEAM Malaysia.

As an important pro-active player in our industry, TEEAM wishes to cordially invite the full support and generous sponsorship from Members and Associates for this win-win Grand Electrical-centric Event, which provides excellent networking opportunities and vast industry exposure, as well as highly valuable and state-of-the-art information exchange plus industry best practices amongst the ASEAN and the Asia-Pacific Electrical Engineering fraternities – and which will positively impact the international playing field!

We sincerely look forward to your dedicated support and are very excited to have your Company to come participate as one of our esteemed Sponsors. Your earnest support and pro-active patronage will contribute greatly to the stellar success of our professional event. Below is the Official Rates' Card for your kind consideration. Meanwhile, should you require further details, please do not hesitate to contact the TEEAM Secretariat for Ms. Thila Sevellengam at Tel: +603-9221 4417 or E-mail: thila@teeam.org.my

Official Rates' Card

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Footnote:

We at TEEAM sincerely look forward to your esteemed presence at this industry-centric AFEEC-FAPECA Conference & Meetings 2024 where the Captains of the Electrical Industry plus members of the fraternity from 8 nations will be gathered together under one roof for one common noble Goal – truly a GOLDEN OPPORTUNITY not to be missed by anyone!
See you and your esteemed staff members over there and be an active part of history-in-the-making!



AFEEC - FAPECA CONFERENCE 2024

Energy Transition – Path to Net Zero

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Electrical Workers Association (SECA), Singapore



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PROGRAMME

- 08.00AM Registration of Conference Delegates
09.00AM Conference Opening & Presentations
- A Holistic Approach to Zero Carbon Emission, Hong Kong
 - Development of a Standard Platform for Sunset Cities, Korea
 - Energy Transition in Taiwan Towards Low-Carbon and Resilient Energy System
 - Energy Transition in Indonesia : Target, Projection, Strategy and Challenges
 - Meralco's Long Term Sustainability Strategy, Philippines
 - Micro Modular Reactor, MMR for Future Energy & Carbon Neutrality, Thailand
 - Malaysian Energy Transition Roadmap : Ways the Industry Can Help
 - Inside Eco-Ark®, A High-Tech Fish Farm in Singapore
- 06.00PM Exhibitors' Networking Night
10.30PM End

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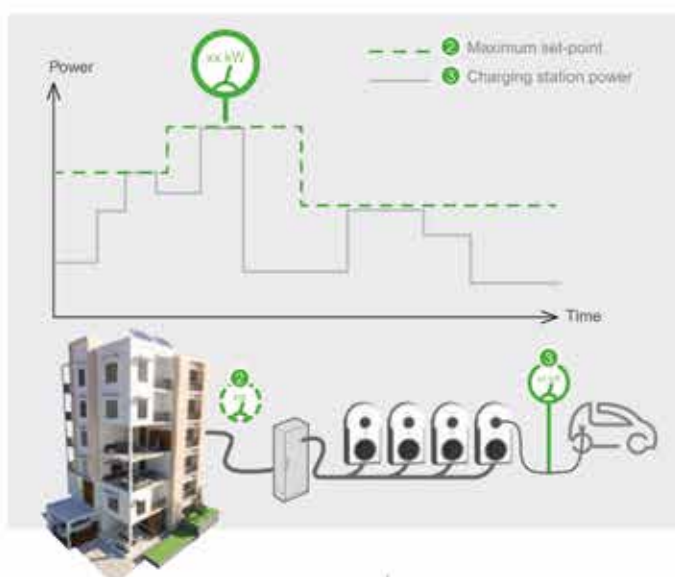
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Smart City Summit & Expo 2024, Taiwan

A delegation of 24-members from TEEAM, led by the President, Ir. Chang Yew Cheong, visited the 2024 Smart City Summit & Expo (SCSE) at Taipei Nangang Exhibition Centre, Taiwan, from 19 to 22 March 2024. Organised by the Taipei Computer Association (TCA), this year's theme focused on "Digital & Green Transformation". Delegates had the opportunity to have 1-to-1 Business Match-Making Meetings with Taiwanese Suppliers and Manufacturers. They also attended the MatchMade Asia: Taiwan, India, ASEAN Green City Business Networking and Forum.

The Selangor State EXCO Member, the Honourable (Yang Berhormat) Mr. Ng Sze Han, was also present at SCSE for an MOU Signing Ceremony between the Selangor Information

Technology and Digital Economy Corporation (SIDEK) and the International Cooperation Centre (ICC) of TCA.

SCSE 2024 was an excellent Expo to source for state-of-the-art Smart Solutions and Green Technologies. It focused on Smart Cities, Smart Transportation, Smart Buildings, Smart Disaster Prevention, Smart Education, 5G Network Applications, and AI Solutions applied in various industries. The Expo also showcased the Taiwanese Government's Policies and Initiatives for Net-Zero Emissions, as well as demonstrating the Policies of all their Government Ministries promoting National and Industrial Green Transformation.

It was a very fruitful visit for all the Delegates and TEEAM hereby wishes to record our sincere thanks and appreciation to TCA for their kind invite and warm hospitality!

Snapshots of Smart City Summit & Expo 2024, Taiwan





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IEC 62930:2017

TÜV EN50618 H1Z2Z2-K DC 1.5KV 1x*mm²
IEC 62930:2017



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Snapshots of Smart City Summit & Expo 2024, Taiwan





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HGM 9510

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ATS CONTROLLER

ATS Control Module



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HAT821



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HAT833

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Technical Visit to Smart Cable (M) Sdn Bhd

TEEAM organised a Technical Visit to Smart Cable (M) Sdn Bhd on 8 March 2024 in Semenyih, Selangor.

Smart Cable (M) Sdn Bhd was incorporated in 2010 as a Manufacturing firm. The company has been actively involved in the manufacturing field, specialising in Low Voltage Cables. Their high-quality products undergo rigorous quality tests and are recognised for their efficiency and durability. The company is committed to building a safe, robust and innovative working environment.

The Technical Visit began with a company introduction and products overview. This was followed by a tour of the factory floor. The Host also included an interactive Q&A session for extra detailed information on their products and production processes. TEEAM members were treated to a sumptuous lunch at Kajang Fei Chui Restaurant. TEEAM wishes to record our sincere appreciation and thanks to Smart Cable (M) Sdn Bhd for their warm hospitality. It was a very fruitful Technical Visit for all the participants.

Snapshots of Technical Visit to Smart Cable (M) Sdn Bhd





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Talk on Malaysia's LHDN e-Invoicing

In view of the challenges faced by members in adjusting to the new e-Invoicing System to be implemented by the Inland Revenue Board (Lembaga Hasil Dalam Negeri – LHDN), TEEAM hosted a half-day Talk on Malaysia's LHDN e-Invoicing on 29 March 2024, at the TEEAM Seminar Hall in Kuala Lumpur.

The Talk was conducted by Ms. Shirley Choong of QNE Optimum Sdn Bhd. In the Talk, she covered topics on e-Invoice Implementation and Timeline, e-Invoice Submission requirements and Process, Transaction Scenarios, and the e-Invoice Software. She is truly a resourceful person and delivered a good presentation highlighting the preparation needed before the approaching deadlines. The detailed timeline as set by LHDN is as follows:

- 1 August 2024: Implement on taxpayers with an annual turnover or revenue of more than RM100 million.
- 1 January 2025: Implementation towards taxpayers with an annual turnover or revenue of between RM25 million to RM100 million.
- 1 July 2025: To achieve full and comprehensive implementation on other remaining taxpayers.

Ms. Choong is an experienced practitioner in the field of AI Cloud Accounting and an e-Invoice Specialist. She is a devoted Trainer and Coach for e-Invoice Implementation, Project Management, and Digital Business Operations.

The Q&A segment was a great sharing session for all to explore the transformative power of e-Invoicing in Malaysian business operations. QNE offered a Lucky Draw prize of QNE AI Cloud Accounting 12-Month Subscription worth RM1,560.00 and the Lucky Winner was Ms Carina Lee.

Some 45 TEEAM members joined and benefitted from the e-Invoicing Talk. Participants gained valuable insights and discovered innovative solutions from QNE. TEEAM would like to record our sincere appreciation and heartfelt thanks to QNE for the great sharing session!





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TEEAM Series of Technical Talks 03/2023

TEEAM conducted the 3rd Technical Talk for 2023 on 21 November 2023 at TEEAM Seminar Hall. TEEAM was honoured to have distinguished Speaker, Mr. Herman Vogel who spoke on “Testing of Insulating Fluids and Diagnostics”. Mr. Vogel is the Vice President of Business Development of TJH2B, which is based in USA. He first gave a description of Diagnostic Oil Tests available including Dissolved Gas Analysis (DGA) and Oil Quality Tests. He went on to talk on Comprehensive Assessment of Transformer and Load Tap Changer. Lastly, he highlighted Oil Sampling Techniques as well.

The second Speaker, Ir. Chew Shee Fuee, who is TEEAM Past President, enlightened the participants on “Transformers: Basics, Maintenance, and Diagnostics”. The participants had the opportunity to hear from the industry’s foremost Practitioners on Transformer Maintenance, which is very important to enhance the safety, reliability and efficiency of the equipment being used. Some 30 participants attended this informative Talk, which was approved with 5 CIDB CCD points. A big thank you to the esteemed Speakers for sharing their valuable insights, depth of knowledge and vast experience with the participants!

Snapshots of the TEEAM Series of Technical Talks 03/2023





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AFEEC & FAPECA Conference & Meetings 2023 in Singapore

The Conference & Meetings of the ASEAN Federation of Electrical Engineering Contractors (AFEEC) and the Federation of Asian-Pacific Electrical Contractors Associations (FAPECA) were successfully held from 15-17 November 2023 at the Marina Bay Sands Expo & Convention Centre, Singapore. The events were hosted by the Singapore Electrical Contractors & Licensed Electrical Workers (SECA). There was overwhelming participation from members of AFEEC and FAPECA, namely, the National Associations including the Association of Indonesia Electrical and Mechanical Contractors (AKLI), Hong Kong Electrical Contractors Association (HKECA), Korea Electrical Contractors Association (KECA), The Society of Philippines Electro-Technical Constructors and Suppliers (SPECS) Inc., Taiwan Electrical Contractors Association (TECA), The Electrical and Electronics Association of Malaysia (TEEAM) and Thai Electrical & Mechanical Contractors Association (TEMCA) and SECA. There were more than 200 delegates and accompanying persons from these National Associations.

The TEEAM Delegation of 16 members was headed by its President, Ir. Chang Yew Cheong. The Delegates were Dr. Siew Choon Thye (Immediate Past President), Ir. Dr. Ng Kok Chiang (Vice President), Mr. Albert Tan (Vice President), Mr. Simon Leong (Honorary Secretary), Dato' Andy Tan (Honorary Treasurer), Mr. Choo Wei Seng (Asst Honorary Treasurer), Mr. Louis Loo (Council Member), Ir. Chow Pui Hee and Mr. Fong Yeng Foon (SAMAIDEN – Members), Ms. Eve Tan and Ir. Tay Siang Hui (MIKRO – Members), Mr. Steven Lim (Council Member), Mr. Kong

Mun Choong (Committee Member), Ms. Amanda Tan (Committee Member) and Ms. Winnie Khong (Executive Secretary).

Conference on Green Technologies in the Built Environment

This Conference which was held on 15 November 2023 was themed “Green Technologies in the Built Environment”. The TEEAM-Malaysia paper entitled “Evolution and Innovation of Solar PV & Battery Energy Storage System: Driving Energy Sustainability” was presented by TEEAM Member, Ir. Chow Pui Hee, who is the Founder and Managing Director of Samaiden Group Berhad and a Professional Engineer with Practicing Certificate Registered with the Board of Engineers Malaysia. It was indeed a very interesting Conference. Some 10 papers were presented by AFEEC and FAPECA country members along the Conference theme. The Guest-of-Honour was Singapore’s Senior Minister of State for National Development, Mr. Tan Kiat How.

Architecture & Building Services 2023 Exhibition

The Conference & Meetings were held in conjunction with the Architecture and Building Services (ABS) 2023 comprising 6 specialised shows with the overarching theme on “Designing a Safe & Resilient Built Environment”. TEEAM also participated in the exhibition, which was held from 15 to 17 November 2023 at the Marina Bay Sands Expo & Convention Centre, to showcase members’ profiles and TEEAM’s activities. Many delegates dropped by TEEAM’s booth to have some photos taken for record purposes.





Welcome Gala Dinner

A warm Welcome Gala Dinner was hosted by SECA on the night of 15 November 2023. It was a night of good networking for fellowship and meeting of new friends. The delegates were excited to network with M&E Contractors and Suppliers from ASEAN and the Asia-Pacific regions, to explore business opportunities. The night was filled with lively singing and everyone truly enjoyed the sumptuous Dinner!

58th AFEEC Council Meeting & 34th FAPECA Board Meeting

The 58th AFEEC Council Meeting was convened smoothly on 16 November 2023. There was an election of new Office-Bearers of AFEEC for the term 2023-2025. The new AFEEC President is helmed by Mr Boonsak Kiatjaroonlert of TEMCA Thailand. SECA Singapore was elected to be the Vice President.

Additionally, the 34th FAPECA Board Meeting was held on 16 November 2023, whereby a new FAPECA President was elected. The FAPECA Presidency is helmed by AFEEC. Hence, Mr Boonsak Kiatjaroonlert is both the AFEEC and FAPECA President. Our heartiest congratulations to TEMCA Thailand! TECA Taiwan was elected to be the Vice President.

During both the AFEEC Council Meeting and FAPECA Board Meeting, it was decided by the members that the 2024 AFEEC & FAPECA Conference & Meeting is to be hosted by TEEAM Malaysia. TEEAM joyfully welcomed the decision and informed all that the event will be held alongside ENERtec Asia 2024 from 26-28 June 2024 in Kuala Lumpur.

Technical Visits to ITE College West and Gardens of the Bay

There were two Technical Visits arranged by SECA in the afternoon of 16 November 2023. The first was to the Institute of Technical Education (ITE) College West and then to Gardens by the Bay. The delegates were very impressed with the training facilities offered at ITE College West whilst in Gardens by the Bay, delegates visited the PV Solar Panels on the Supertrees

and also learnt about their Biomass Plant for the Generation of Electricity from Plant Waste. These Technical Visits were indeed very educational.

Visit to URA Singapore

The TEEAM Delegation made a visit to the Singapore Urban Redevelopment Authority City Gallery on 17 November 2023. It charts Singapore's urban transformation and future plans. The Gallery documents the fascinating evolution of Singapore's cityscape and urban planning across the decades. URA is Singapore's Land-use Planning Conservation Agency. Its mission is "To make Singapore a great city to live, work and play". It was a very interesting visit.

SECA Golf Tournament

The next day on 17 November 2023 was the much-awaited SECA Golf Tournament. Unfortunately, due to the rain, golfers only managed to finish 9 holes. Nevertheless, it turned out to be a good friendly game for networking. TEEAM had 4 golfers, namely, Mr. Albert Tan, Mr. Steven Lim, Mr. Kong Mun Choong and Ms. Amanda Tan.

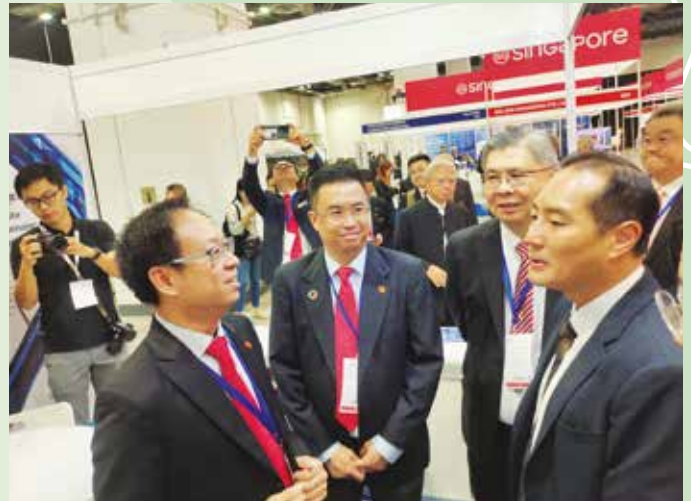
Farewell Dinner

In the evening, the Farewell Dinner was held at the Grassroot's Club, Eternal Garden. It was a night to bid farewell with joyous singing and toasting. SECA presented a T-shirt to each delegate as a souvenir for remembrance and everyone wore it that night in unison! It was indeed a fun-filled night with highly entertaining Karaoke singing and dancing amongst the delegates. Every delegate truly enjoyed SECA's warm hospitality. A big thank you to SECA for all the praiseworthy arrangements!

AFEEC & FAPECA 2024

The 2024 AFEEC & FAPECA Conference & Meetings will be hosted by TEEAM in-conjunction with ENERtec Asia 2024 from 26 to 28 June 2024 at the Kuala Lumpur Convention Centre, Malaysia. See you soon!

Snapshots of AFEEC & FAPECA Conference & Meetings 2023 in Singapore



Snapshots of AFEEC & FAPECA Conference & Meetings 2023 in Singapore



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Talk on Route to Professional Engineer and Chartered Engineer Certifications

TEEAM successfully organised a Talk on Route to Professional Engineer (PEng) and Chartered Engineer (CEng) on 28 October 2023 at the TEEAM Seminar Hall with the support of the Institution of Engineers Malaysia (IEM) and the Institution of Engineering & Technology Malaysia (IET Malaysia). Esteemed speaker from IEM, Ir. Chong Chew Fan, spoke on the requirements needed for the Professional Engineer application. The various routes available for the Graduate Engineer to apply to be a Professional Engineer were shared by Ir. Chong. He is the current President of the Association of Consulting Engineers Malaysia (ACEM).

Eur Ing. Ir. Victor Nagesparan of IET Malaysia highlighted the route to be a Chartered Engineer, i.e., the requirement and eligibility to apply for the Chartered Engineer designation. Chartered Engineer is an engineer registered with the UK's Regulatory Body for the Engineering profession, i.e., the Engineering Council. Chartered Engineer is an internationally-recognised qualification and the successful applicant is recognised as a Professional and Competent Engineer. Incidentally, Eur Ing. Ir. Victor is an Assistant Professor with UCSI University, Kuala Lumpur.



Ir. Lee Kok Chong (TEEAM Vice President – Engineering Construction & Services) welcoming the participants to the Talk.



Speaker, Ir. Chong Chew Fan delivering his topic on Route to PEng.



Participants listening attentively to Speaker, Eur Ing. Ir. Victor Nagesparan.



(from left) Ir. Lee Kok Chong (TEEAM Vice President – Engineering Construction & Services), Mr. Simon Leong (TEEAM Honorary Secretary), Ir. Chong Chew Fan (Speaker), Ir. Chang Yew Cheong (TEEAM President) and Eur Ing. Ir. Victor Nagesparan (Speaker).



(left) TEEAM Deputy President, Ts. Lim Sai Seong and Vice President, Ir. Lee Kok Chong.



(left) Speaker, Ir. Chong Chew Fan receiving a Certificate of Appreciation from TEEAM President, Ir. Chang Yew Cheong.



(left) Speaker, Eur Ing. Ir. Victor Nagesparan receiving a Certificate of Appreciation from TEEAM President, Ir. Chang Yew Cheong.

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MPC EEPN Strategic Planning Session

On 8 December 2023, TEEAM was invited to attend the Malaysia Productivity Corporation (MPC) Electrical & Electronics Productivity Nexus (EEPN) Strategic Planning and Way Forward Session 2024 at Hotel Armada, Petaling Jaya, Selangor.

The objective of this Strategic Session was to discuss and align EEPN Strategic Planning and Way Forward Initiatives in 2024, to the New Industrial Master Plan (NIMP) 2030 and the E&E Roadmap.

TEEAM was represented by Ts. Lim Sai Seong (Deputy President), Ir. Dr. Ng Kok Chiang (Vice President) and Dr. Siew Choon Thye (Immediate Past President). Ir. Dr. Ng gave an introduction on TEEAM. With TEEAM's dedicated involvement in the EEPN, the Association hoped to push our direction of up-skilling and qualifying more competent persons. It will also be an excellent platform to strengthen TEEAM's role as the backbone of building the E&E ecosystem of Malaysia and helping our members in expanding their businesses. Sincere thanks to MPC for a very fruitful session!



Snapshots of the MPC EEPN Strategic Planning Session



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Technical Visit to CHINT Malaysia

CHINT Malaysia hosted a Technical Visit for members of TEEAM at the CHINT Experience Centre in Glenmarie, Shah Alam on 21 February 2024. On arrival, members were warmly welcomed by Mr. Tey Siang Leng, CHINT Malaysia CEO and his strong Technical Team. This was followed by a Technical Briefing on CHINT's Products and Services. Members had the opportunity to view the CHINT Electrical Vehicle (EV) Charging Station demo and also had an in-depth understanding of CHINT's range of protection products. CHINT also shared their Solar Photovoltaic (PV) Solution with TEEAM members.

It was a very interesting and fruitful Technical Visit, which ended with a sumptuous lunch hosted by CHINT at Dorsett Subang Hotel, Selangor. A big thank you to CHINT Malaysia for their warm hospitality!



Snapshots of the Technical Visit to CHINT Malaysia





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TEEAM hosted the 1st Series of Technical Talks for 2024 on 13 March 2024 at TEEAM Seminar Hall. The first topic was “Fire Risk Management of 21st Century: Emerging Risk -- Lithium-Ion Battery” by Mr. Tay Hao-Giang. Mr. Tay was the Past International President of the Institution of Fire Engineers (IFE), UK, and he is the current Deputy President of the IFE, Malaysia Branch.

Global warming-induced climatical changes have accelerated the green energy movement. This has resulted in solar, wind, hydro and other renewable power generation globally. Renewable energies require large battery storage to power townships since coal power generation contributes to carbon footprint and pollution. Globally, we have moved into an Electric Era with the switch from ICE (Internal Combustion Engine) to Hybrid, and on to EV (Electric Vehicles). The Lithium-Ion battery industry has flourished to fulfil market demand for EVs, handphones, electrical scooters, electrical tools for energy storage, and for ease of operation.

Though the demand for large batteries for EV is just the beginning considering the history of the EV market, there has been international EV car fire cases which expose the fire risks and hazards of Lithium-Ion batteries beyond comprehension. Of late, large MW renewable energy storage facilities in different countries also present interesting case studies of the exposure to fire risk and the hazard of Lithium-Ion batteries. Many countries have also banned the e-scooter due to the explosive fire caused by batteries while charging. Statistical increase of burning

handphones and power banks during flight is another concern of aviation safety.

While the world is focusing on the green and renewable movement, it seems life safety and fire safety has not been incorporated into the design and development of batteries. Mr. Tay reviewed some of the above case studies and proposed mitigation measures. He gave an excellent sharing session on the emerging risk of Lithium-Ion batteries.

This was followed by the second topic on “Challenges and Opportunities Caused by the Introduction of EVs” by Ir. Chew Shee Fuee, TEEAM Past President.

Over 26 million electric cars were on the road in 2022, up 60% relative to 2021 and more than 5 times the stock in 2018. Increasing sales pushed the total number of electric cars on the world's roads to 26 million, up 60% relative to 2021. Malaysia is picking up on this EV trend. The number of EVs sold in Malaysia in 2023 was 10,159 compared to 2,631 units in 2022.

Ir. Chew highlighted EV charging requirements, the existing guide to EV Charging Station (EVCS) installation, fire concerns and mitigations, and future power requirement planning for EVCSs.

It was a fruitful Technical Sharing Session for all participants and also provided an excellent opportunity for networking amongst fellow members. Some 50 participants attended the Talk, which was approved with 5 CCD points by CIDB. Stay tuned and be ready for the next Technical Talk which is set for July 2024!

Snapshots of the TEEAM Series of Technical Talks - 01/2024



Release of BNM's Publications: AR 2023, EMR 2023 and FSR 2H 2023

On 20 March 2024, Bank Negara Malaysia (BNM) held a Press Conference on the release of its flagship publications, namely BNM's Annual Report 2023 (AR 2023), Economic & Monetary Review 2023 (EMR 2023) and Financial Stability Review for Second Half 2023 (FSR 2H 2023). At the Press Conference, BNM Governor, Datuk Abdul Rasheed Ghaffour said, "Our prospects are good. We have reason to cautiously anticipate a better year ahead. There is also a favourable window of opportunity to implement crucial structural reforms. By taking decisive and collective actions, we can capitalise on Malaysia's robust and resilient economic rebound post-COVID and lay the path for sustained growth and prosperity. While there may be challenges during this transition, these reforms are investments in our future towards prosperity of our Rakyat (The People) and the Nation."



BNM's Press Conference on 20 March 2024 at BNM's Headquarters.

BNM's Annual Report 2023

The AR 2023 details BNM's key initiatives in fulfilling its mandates to promote monetary and financial stability conducive to the sustainable growth of the Malaysian economy in 2023. It also provides an account of BNM's operations and resources that enable it to function effectively and efficiently.

Highlights of BNM's AR 2023:

- The Malaysian economy continued to show strength and resilience in 2023. Despite the challenging external environment, GDP grew by 3.7%. Amidst the slowdown in global economy and inflationary pressures domestically, BNM considered and managed the complex policy trade-offs and inter-dependencies between inflation, growth, and preserving confidence in the ringgit.
- BNM's pro-active efforts to ensure financial intermediation activities will support the economic reform agenda with particular focus on Micro, Small and Medium Enterprises (MSMEs), by improving the features of our special funds and scaling up social finance initiatives.
- Efforts undertaken to advance value-based intermediation and promote solutions by the Islamic finance industry to meet the demand for green and sustainable finance.
- BNM continued its efforts to enhance climate resilience and manage climate-related risks within the financial sector. These concerted efforts aimed to support financial institutions and the real sector transition to a greener economy, in line with national policies and strategies. BNM also continues to make progress in integrating climate-related risk into prudential regulation and supervision.
- Combatting online financial fraud remained a key focus. BNM worked closely with the financial industry and law enforcement agencies to improve fund tracing, disrupt fraudulent fund flows and raise awareness on the latest scam tactics and disseminated prevention tips.
- BNM launched the Financial Inclusion Framework 2023-2026 which outlines strategies to close the remaining gaps in access to quality and affordable financial services for all.
- Key regulatory and supervisory programmes were put in place to further strengthen the ability of the financial system to withstand shocks. BNM also enhanced market conduct requirements for financial institutions to re-inforce its responsibilities to safeguard consumer interests, especially when dealing with vulnerable consumers. BNM is also increasing the financial sector's preparedness to face crises through recovery and resolution planning, and simulation exercises.

Eight articles are featured in the AR 2023:

- ❖ DuitNow QR: Fostering Inclusive Digital Payments
- ❖ iTEKAD: An Eco-system Approach in Scaling Up Social Finance
- ❖ Realising the Value-Based Intermediation Vision (VBI): Five Years After Introduction
- ❖ Personalising Financial Services: Promoting Fair Treatment of Vulnerable Consumers
- ❖ Supporting SMEs' Transition to Greener Practices
- ❖ BNM's Enforcement Approach and Disclosures of Enforcement Actions
- ❖ Behind-the-Scenes of Bank Negara Malaysia's Monetary Policy-Making
- ❖ Promoting Cross-Border Local Currency Settlement (CB LCS)

The BNM AR 2023 also sets out BNM's Audited Financial Statements for the financial year ended 31 December 2023. As audited and certified by the Auditor General, the financial position of BNM remained stable in 2023. BNM's total assets amounted to RM631.26 billion as at 31 December 2023. A net profit after tax of RM7.16 billion was recorded for the financial year, of which RM4.31 billion has been transferred into BNM's Risk Reserve. BNM has declared a dividend of RM2.85 billion to the Government for the financial year 2023.

BNM's Economic and Monetary Review 2023

The BNM Economic and Monetary Review sets out BNM's economic assessments and forecasts.

Highlights of BNM's EMR 2023:

- The Malaysian economy is projected to grow between 4% and 5% in 2024. This will be supported by the resilient domestic demand and improvement in external demand.
- Headline inflation is expected to average between 2% and 3.5% in 2024 amid contained cost pressures from easing global supply conditions. Inflation outlook remains highly subject to upside risks due to potential price adjustments on food and energy items, as well as external pressures from exchange rate and global commodity price developments.
- Domestic monetary and financial conditions remain conducive of financial intermediation. Credit supply will be supported by continued willingness of financial institutions to lend amid a strong banking system and a healthy capital market. In addition, the improving economic and labour market conditions will support credit demand.

- BNM's monetary policy will continue to be forward-looking with a strong focus on the trajectory of growth and inflation.
 - Given Malaysia's strong fundamentals and positive growth prospects, the current Ringgit level is under-valued.
 - Following this and beyond conducting foreign exchange operations, BNM has been actively engaging with Government-Linked Companies (GLCs) and Government-Linked Investment Companies (GLICs) to encourage more consistent repatriation and conversion of their foreign investment income into Ringgit. At the same time, BNM is closely monitoring the trends of foreign currency holdings by Malaysian Corporates, Exporters and Importers. These actions are contributing to positive outcomes. BNM has seen increased flows and market interest in buying the Ringgit.
 - Looking ahead, financial markets expect the Ringgit to appreciate further into 2024 and continue on an appreciating trend as the effects of global factors subside. Some analysts have projected further into 2025 and assess the Ringgit to continue strengthening.
- The EMR 2023 features four articles, viz.:
- Underlying Inflation at its Core
 - Navigating Economic Cycles: Interactions between Monetary and Fiscal Policies
 - The Case for Labour Market Reforms in Malaysia: Challenges and Opportunities
 - The Ringgit in Perspective

BNM's Financial Stability Review for Second Half 2023

The BNM Financial Stability Review is a bi-annual publication which details BNM's assessment of domestic financial stability risks and outlook.

Highlights of BNM's FSR 2H 2023:

- Despite global volatility, domestic financial markets remain orderly with continuous intermediation of two-way flows in the bond and equity markets.

- The overall debt-servicing ability of businesses and households remains healthy. Evolving loan performance trends are within banks' expectations.
- Latest stress tests conducted by BNM affirm the resilience of financial institutions against unexpected losses from severe macro-economic and financial shocks. This will continue to support all financial institutions' ability to fulfil the financing and protection needs of households and businesses.
- Strengthening operational and cyber resilience remains a top priority for BNM and financial institutions. BNM continues to require financial institutions to adopt strong cyber-hygiene standards. BNM has also taken pro-active steps to strengthen collaboration with local and international counterparts through more timely sharing of cyber threat intelligence.

Four articles are featured in the BNM FSR 2H 2023:

- ❖ Progress in Strengthening Climate Risk Management Practices
- ❖ Contagion Risk from Non-Bank Financial Institutions' (NBFI) Activity
- ❖ The Imperatives for Strengthened Regulation and Supervision of Liquidity Risk in Malaysia
- ❖ Floods and Finance: Building Resilience of Malaysian Businesses

For more details of the BNM's Publications, please visit www.bnm.gov.my/AR2023

Acknowledgement

Source: Bank Negara Malaysia (BNM)

Bank Negara Malaysia (BNM)

BNMLINK Contact Centre

Tel: 1-300-88-5465

BNM General Line

Tel: +603-2698 8044044

Meeting with the Secretary-General of RICC

TEEAM President, Ir. Chang Yew Cheong, had a fruitful meeting with Ms. Jennifer Liu, Secretary-General of RCEP Industry Co-operation Committee (RICC) on 7 March 2024 at the Sheraton Imperial Kuala Lumpur Hotel. The meeting discussed co-operation amongst businesses in the E&E sector by tapping on the RCEP (Regional Comprehensive Economic Partnership), which is the world's largest Free Trade Area in terms of combined Gross Domestic Product (GDP) and Market Size, accounting for almost one-third of the world's population. Ir. Chang was accompanied by TEEAM Deputy President, Ts. Lim Sai Seong.

The RCEP Free Trade Agreement was signed on 15 November 2020 amongst the Asia-Pacific nations of the 10 ASEAN countries and China, Japan, South Korea, Australia and New Zealand. The RICC was established in Beijing on 16 April 2021. The Co-operation Committee is mainly composed of representatives of the business communities from the 15 RCEP member states. The RICC Committee pledged to promote regional industrial co-operation and work together to promote the implementation of the RCEP Agreement.



Ms. Jennifer Liu (Secretary General of RICC) with TEEAM President, Ir. Chang Yew Cheong (left) and TEEAM Deputy President, Ts. Lim Sai Seong.



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ST & TEEAM Electrical Safety Programme 2023

TEEAM collaborated with the Energy Commission (Suruhanjaya Tenaga – ST) on Electrical Safety Programmes at the HOMEDEC 2023 Exhibition and at the AEON Taman Maluri Shopping Centre, Kuala Lumpur, from 26 to 29 October 2023 and from 15 to 17 December 2023 respectively. These programmes aimed to promote Electrical Safety and

Energy-Saving to the public. There were very interactive Pocket Talks on Electrical Safety and Colouring Contests for children, and also lots of activities for the family and kids to instil Electrical Safety Awareness. These were very successfully co-ordinated Electrical Safety Programmes to reach out to the public, including roping in the young ones at an early, impressionable age!

Snapshots of Electrical Safety Programme 2023 @ HOMEDEC 2023



Snapshots of Electrical Safety Programme 2023 @ AEON Taman Maluri Shopping





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TEEAM Fellowship Nites 2023

TEEAM Fellowship Nites 2023 were successfully organised on 11 October 2023 and 3 December 2023 at the M&E Lounge, Paramount Garden, Petaling Jaya. Some 50 members attended each of these networking events. There were delicious food, beers, laughters, talks, exchanges of name cards and pitching opportunities for

new members to introduce their Companies' products and services. Our sincere appreciation and heartfelt thanks to SIK Supply for co-sponsoring the Fellowship Nite 01/2023 with TEEAM. A big thank you too to Dpstar and Zofar M&E for sponsoring the Fellowship Nite 02/2023. Every member who attended had a great time. Cheers!

Snapshots of the TEEAM Fellowship Nite 01/2023 on 11 October 2023



Snapshots of the TEEAM Fellowship Nite 02/2023 on 3 December 2023



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Tunnel Lighting
TUNNEL BRICKFIELD, KL

*Full list of project reference available upon request



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✉ Email: info.gruppelighting.com

🌐 Website : www.gruppelighting.com

Technical Visit to Megapro Metal Industries Sdn Bhd

On 8 March 2024, TEEAM members also paid a Technical Visit to Megapro Metal Industries Sdn Bhd in Semenyih, Selangor.

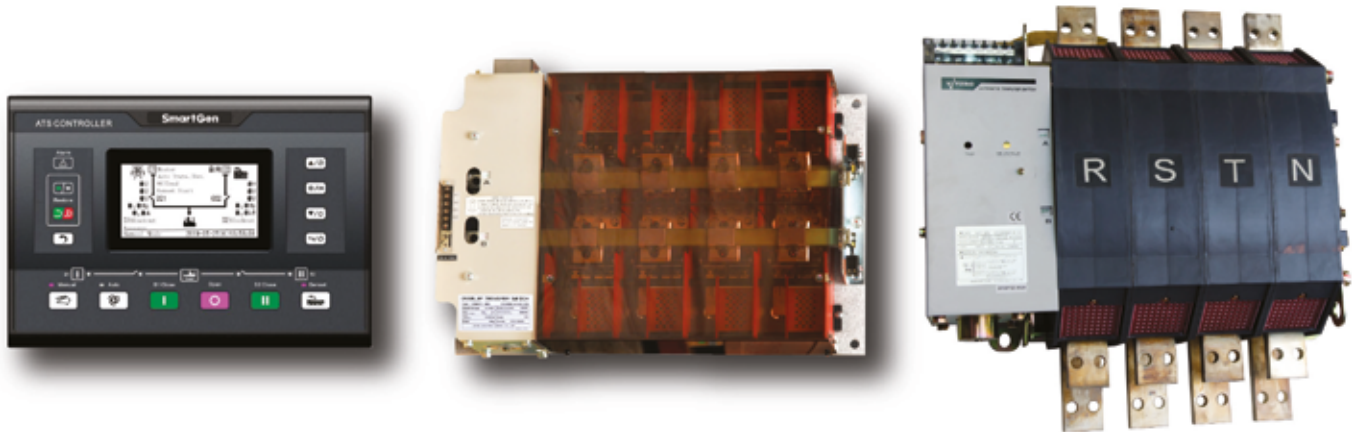
Megapro Metal Industries Sdn Bhd, established since 2018, is professionally led by a team of aspiring Entrepreneurs who wish to provide efficient, reliable and optimum cost solution to Cable Management Systems. Its state-of-the-art manufacturing plant utilises the latest technology and has a dedicated assembly line to take on and build all orders to specifications and timely deliveries. The Technical Visit began with an introduction to the company and a review of its Cable Support System, namely: Metal Trunking, Perforated Cable Tray, Cable Ladder, and others. A visit to the factory floor ensued. TEEAM wishes to record our sincere appreciation and thanks to Megapro Metal Industries Sdn Bhd for the interesting and fruitful Technical Visit, and the sumptuous hi-tea!



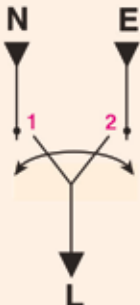
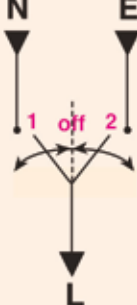
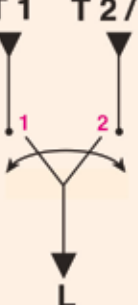
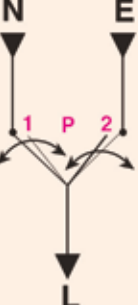
Snapshots of Technical Visit to Megapro Metal Industries Sdn Bhd



Automatic Transfer Switch (ATS) with Smart Transfer Controller



MS IEC 60947-6-1

ATS 2 pole, 3 pole, and 4 pole	 Open Transition Without "OFF" position	 Open Transition With or Without "OFF" position	 HIGH SPEED Open Transition With "Sync Check" feature	 Close Transition With "Sync check" feature	
	Aichi	W2/WN	WN	WS	WP
	VITZRO TECH	W/WN	WN	-	CTTS
	Transfer speed	≥ 55ms	Delay adjustable	≤20 ms *To CBEMA / ITIC Curve	7-50ms* *Contact Overlapping time

*For Data Centre Application - Parallel Redundancy / E-T1 $\leq 5\text{ms}$

- ATS with micro-processor based controller
- Double-throw mechanism for dedicated source switching
- Solenoid operated for quick transfer
- Inherent mechanical interlock
- Mechanically held contacts
- High Electrical operation
- High Mechanical operation
- High withstand short time current ratings



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Challenges and Opportunities in the Electrical Industry – Part 44

Ir Chew Shee Fuee KMN, TEEAM Past President

Fire Safety Guidelines for Electric Vehicle Charging Bay

The number of EVs (Electric Vehicles) is increasing steadily in the last few years. This positive trend will continue and the demand on charging bays will be more as the days go by.

Although the EVs are beginning to be well received by car owners, there is an inherent risk because of the batteries. Malaysia's fire safety regulator has unveiled its comprehensive safety guidelines for Electric Vehicle Charging Bays (EVCBs).

The Government has set a target of 10,000 EVCBs by 2025.

It is recognised that there is currently no effective fire-fighting methods in case of an EV fire.

Fire Safety Installation Requirements

EVCB Location

EVCBs must be installed away from stairs, safety exits, or building exit pathways that may be obstructed during a fire or emergency.

Fire-fighting Equipment

Dry powder type fire extinguishers should be provided.

Vehicle Fire Blankets (VFBs) should be provided based on the following number of EVCBs installed:

Number of bays	Number of VFB(s) required
1	1
2-10	2
11-15	3
More than 15	1 VFB for every 5 EVCBs

The Main Electrical Isolation Switch

Each EVCB must have an automatic and manual Main Electrical Isolation Switch.

The position of the Main Electrical Isolation Switch must be at least 3 metres away from the charging bay and the EVCP (Electric Vehicle Charging Point) but not more than 15 metres away.

The Main Electrical Isolation Switch can

be shared by several EVCPs, complying with the specified distance. Activation of any Main Electrical Isolation Switch will disconnect the electrical power supply to all EVCPs.

Additional Electrical Main Isolation Switch Requirement

Connect the Main Electrical Isolation Switch of the EVCB with a fireman switch.

For details of the guidelines, please visit the official Fire Brigade site listed below:

<https://www.bomba.gov.my/wp-content/uploads/2023/11/Garis-Panduan-Keselamatan-Kebakaran-Bagi-Electric-Vehicle-Charging-Bay-EVCB-di-Premis.pdf>

Ir. Chew Shee Fuee KMN B Sc (Hons) (Strathclyde), PEng, CEng, FIEM, MIEE Member, IEEE Member, 1st Grade Electrical Engineer (Competent up to 500 kV).

Ir. Chew was President of The Electrical and Electronics Association of Malaysia (TEEAM) from 2001-2005 and 2013-2017. He was the President of the ASEAN Federation of Electrical Engineering Contractors (AFEEC) for 2016-2018. He is a Past Chairman of The Institution of Engineering & Technology (IET) Malaysia Local Network. Ir. Chew is currently the Managing Director of G H Liew Engineering (1990) Sdn Bhd and Chris Chew Electrical Consultant. He graduated from the University of Strathclyde, Glasgow with a B Sc (Hons) in Electrical & Electronics Engineering. He is a Professional Engineer and is also licensed by the Energy Commission (Suruhanjaya Tenaga, ST) as a Competent Engineer (without voltage limits), and a Service Engineer to carry out electrical testing up to a voltage of 500 kV.

Ir. Chew has more than 40 years of industry experience in electrical control and relay protection. He is also specialised in electrical site tests on power equipment, electrical fault investigation, plus service and maintenance of electrical switchgears and relays. His work also includes electrical supervision of sub-stations and electrical audit. He also presents lectures on electrical apparatus and the protection system. He can be reached at e-mail: sfchew@ghliew1990.com



Membership Recruitment Campaign

TEEAM appeals to members to help in recruiting companies and individuals to join the association to strengthen TEEAM's membership base. Incentives are offered by the Membership Recruitment Committee. Members introducing a new company member will be entitled to two points, whilst introducing an individual member will be entitled to one point. The points can be accumulated and used to redeem free advertisements in Suara TEEAM or redeem membership subscription.

For details, please contact the TEEAM Secretariat at Tel: +603 - 9221 4417.

The membership application form can be downloaded from the TEEAM website at www.teeam.org.my



TEEAM Golf Tournament 2023

25 October 2023

Tropicana Golf & Country Club

The TEEAM Golf Tournament 2023 attracted an impressive 142 enthusiastic golfers. It was a successful event held at the Tropicana Golf & Country Resort, Petaling Jaya on 25 October 2023, which teed-off in the morning. This Golf Tournament created an excellent platform for social and business networking amongst TEEAM members and guests. TEEAM sincerely wishes to thank all golfers for their strong support, particularly the generous Sponsors for making the event a huge success. A big round of applause to Smart Cable (M) Sdn Bhd for their generous sponsorship of the Championship prizes. Every golfer truly enjoyed themselves.





KYODO PIPE STANDARD GALVANISED STEEL CONDUIT

BS 31 CLASS B (SCREWED) / MANUFACTURER'S STANDARD

NOMINAL SIZE	OUTSIDE DIAMETER				WALL THICKNESS				CALCULATED WEIGHT WITH COUPLER			NUMBERS OF THREADS	LENGTH OF THREADS			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM						MINIMUM		MAXIMUM	
in	mm	in	mm	in	mm	in	mm	in	kg/m	kg/ft	lb/ft	PER INCH	mm	in	mm	in
¾	18.76	0.7387	19.05	0.7500	1.52	0.060	1.63	0.064	0.713	0.217	0.479	16	12.70	0.5000	14.29	0.5625
1	25.11	0.9887	25.40	1.0000	1.52	0.060	1.63	0.064	0.972	0.296	0.653	16	15.88	0.6259	17.46	0.6875
1¼	31.46	1.2387	31.75	1.2500	1.52	0.060	1.63	0.064	1.240	0.376	0.830	16	17.46	0.6875	19.05	0.7500
1½	37.80	1.4880	38.10	1.5000	1.73	0.068	1.83	0.072	1.680	0.511	1.130	14	19.05	0.7500	20.64	0.8125
2	50.50	1.9880	50.80	2.0000	1.93	0.076	2.03	0.080	2.510	0.765	1.690	14	22.23	0.8750	23.81	0.9375

MS 275 / BS 4568 CLASS 3 (SCREWED) / MANUFACTURER'S STANDARD

NOMINAL SIZE	OUTSIDE DIAMETER		WALL THICKNESS	CALCULATED WEIGHT WITH COUPLER		PITCH	LENGTH OF THREADS	
	MINIMUM	MAXIMUM		MINIMUM	MAXIMUM		MINIMUM	MAXIMUM
mm	mm	mm	mm	kg/m	kg/m	mm	mm	mm
20	19.7	20.0	1.6 ± 0.15	0.643	0.783	1.5	13	15
25	24.6	25.0	1.6 ± 0.15	0.811	0.995	1.5	16	18
32	31.6	32.0	1.6 ± 0.15	1.069	1.301	1.5	18	20

MS IEC 61386-1 / MS 61386-21 CONDUIT SYSTEM FOR CABLE MANAGEMENT

NOMINAL SIZE	OUTSIDE DIAMETER		INSIDE DIAMETER	EXTERNAL THREAD LENGTHS
	MINIMUM	MAXIMUM	MINIMUM	MINIMUM
mm	mm	mm	mm	mm
20	19.7	20.0	1.6 ± 0.15	13
25	24.6	25.0	1.6 ± 0.15	16
32	31.6	32.0	1.6 ± 0.15	18



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6012.314.9968 (Sales)

Snapshots of TEEAM Golf Tournament 2023



Thanks to Our Golf Sponsors

The TEEAM Sports Sub-Committee wishes to record its thanks and appreciation to the following Sponsors for their generous sponsorship of goodies, prizes and cash for the TEEAM Golf Tournament 2023:

Abbaco Controls Sdn Bhd
RM500

Alpha Automation (Selangor) Sdn Bhd
RM2,000 & 40 dozens Golf Balls

Bond M & E (KL) Sdn Bhd
RM4,000

Candlelux Marketing Sdn Bhd
RM2,000

Chi-Tak Electrical (Selangor) Sdn Bhd
RM2,000

Controls Handling Engineering Sdn Bhd
RM1,000

CVS Metal Industries Sdn Bhd
RM1,000

DNF Cable Sdn Bhd
RM2,000

Eco Electric System Sdn Bhd
RM1,000

EITA Electric Sdn Bhd
Beer for Lunch

EPE Power Switchgear Sdn Bhd
T-shirt (RM4,500)

Fajar Cables Sdn Bhd
RM1,000

Fuseline Electric & Engineering Sdn Bhd
RM1,000

G & H Electrical Trading Sdn Bhd
Kaiice Ice shave Dessert

Galvapole Industries Sdn Bhd
RM7,000

Genuine Electric Sdn Bhd
RM 2,000

Hang San Electrical Supplies Sdn Bhd
RM1,000

Hong Seng Power Sdn Bhd
RM2,000

Jalita Engineering Sdn Bhd
RM1,000

LEDVANCE Sdn Bhd
T-Shirt

Legrand Group Brands (M) Sdn Bhd
RM5,000

Lelek Intertrade Sdn Bhd
Amplang Fish Ball Crackers

Levecon Automation (M) Sdn Bhd
RM5,000

Magnum Pro Marketing Sdn Bhd
RM2,500

Maxlux Malaysia Sdn Bhd
RM1,000

Micronation Sdn Bhd
Bushnell Vouchers

Megahock Pipes & Profile Mfg. Sdn Bhd
RM2,500, T-shirt & Izzo Versa Stand Bag

Megapro Metal Industries Sdn Bhd
RM2,500 & Callaway Rogue-3 Wood

Mikro Sdn Bhd
RM7,000 & T-shirt (RM4,500)

Mitsubishi Electric Sales Sdn Bhd
Mitsubishi Table Fan (5 units)

Multi Wire Sdn Bhd
RM1,000

Nanyang Electric Co. (M) Sdn Bhd
RM2,000

Netverk (Bar & Restaurant)
Tomahawk Steak Vouchers & Netverk F&B Vouchers

Omron Electronics Sdn Bhd
RM2,000

Pawalite Marketing Sdn Bhd
RM1,000

Pekat Group Berhad
Solaroo discount vouchers RM2,000, Izzo Versa Bags & Izzo Lite Bags & Odyssey Putters

PLK Electrical Accessories Manufacturer Sdn Bhd
RM1,000

Protech Builders Sdn Bhd
RM2,500

SB Elektrik & Elektronik Sdn Bhd
Hole-in-One (Proton Saga 1.3), SBE Industrial Stand Fans, SBE Insert Killer Fittings, SBE Blenders, SBE Dry Irons, SBE Jug Kettles

SEP Electric (M) Sdn Bhd
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RM1,000

Sin Lian Wah Lighting Sdn Bhd
RM1,000

Sin Lien Siong Electric (M) Sdn Bhd
RM1,000

Smart Cable (M) Sdn Bhd
Championship cash Prize RM13,000, 50g Gold Bar (worth RM18,888) & 36 dozens Golf Balls

SNJ Lite Trading Sdn Bhd
Golf Bags

Southern Cable Sdn Bhd
RM2,000

Stardex Trading Sdn Bhd
RM 6,000 & TV (RM1,000+)

Success Electronics & Transformer Manufacturer Sdn Bhd
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Terasaki Electric (M) Sdn Bhd
Bath Towel

United MS Cables Mfg. Sdn Bhd
RM2,000

United MS Electrical Mfg. (M) Sdn Bhd
RM2,000

United U-Li (M) Sdn Bhd
RM3,000

Utama Cables Sdn Bhd
RM1,000

WH Electrical Marketing (M) Sdn Bhd
RM2,000

Wong Electrical & Teak Wood Sdn Bhd
RM1,000

Wong Electrical & Teak Wood (Selangor) Sdn Bhd
RM1,000

Xiong Cheng Manufacturing Sdn Bhd
RM2,000 & Umbrellas, Face Towels, Warmer Mugs, Caps & Recycle Bags

Golf Tournament Winners

GROSS (VIP GUESTS)

Gross Champion:

Low Teck Poh

Trophy + Transview voucher
RM2,000

2nd Prize:

Ir. Chew Siang Meng

Trophy + Transview voucher
RM1,000

3rd Prize:

Ir. Chia Soon Yoon

Trophy + Transview voucher
RM800

4th Prize:

Tan Chee Wooi

Trophy + Transview voucher
RM500

5th Prize:

Wong Tai Wah

Trophy + Transview voucher
RM200

NETT (VIP GUESTS)

Nett Champion:

Ir. Wong Lue Chien

Trophy + Transview voucher
RM2,000

2nd Prize:

Dato' Tan Chong Jin

Trophy + Transview voucher
RM1,000

3rd Prize:

Yasuyuki Saito

Trophy + Transview voucher
RM800

4th Prize:

Vincent H. T. Tan

Trophy + Transview voucher
RM500

5th Prize:

Liong Kok Kit

Trophy + Transview voucher
RM200

BEST PLAYER OF THE DAY

Yap Wai Mun

50g Gold Bar worth RM18,888
*sponsored by Smart Cable (M)
Sdn Bhd*

GROSS (TEEAM MEMBERS)

Gross Champion:

Lim Chee Chuan

Trophy + Cash RM5,000 + Smart
Cable Cup
*sponsored by Smart Cable (M)
Sdn Bhd*

2nd Prize:

Francis Heng

Trophy + Transview voucher
RM2,000

3rd Prize:

James Heng

Trophy + Transview voucher
RM1,000

4th Prize:

Wona Jiann Shyong

Trophy + Transview voucher
RM800

5th Prize:

Alex Go

Trophy + Transview voucher
RM500

NETT (TEEAM MEMBERS)

Nett Champion:

Soon Fong Piew

Trophy + Cash RM5,000 + Smart
Cable Cup
*sponsored by Smart Cable (M)
Sdn Bhd*

2nd Prize:

Philip Tang Tung Kee

Trophy + Transview voucher
RM2,000

3rd Prize:

Amanda Tan

Trophy + Transview voucher
RM1,000

4th Prize:

Cheong Pak Fatt

Trophy + Transview voucher
RM800

5th Prize

Chong Kok Wah

Trophy + Transview voucher
RM500

6th Prize

Lee Peng Sian

Transview voucher RM300

7th Prize

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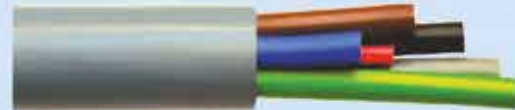
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space of over 110,000 sqm. Some 15,000 pre-scheduled Business Meetings amongst Buyers and Sellers were organised. TEEAM's Delegation headed by Mr Suresh Kumar Gorasia (Past President) attended the Reverse Buyers-Sellers Meet (RBSM) Programme to explore business opportunities. Members from our State Association, the Electrical Association of Sarawak & Sabah (EASS) too, joined the programme. It was a very fruitful visit for all who had participated!

Snapshots at ELEC RAMA 2023, India



The Dynamics of Direct Investment Abroad (DIA) for Malaysia

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Introduction

As a significant player in South-east Asia's economic landscape, Malaysia continues to assert its global presence through Direct Investment Abroad (DIA). In the era of globalisation, Malaysia's DIA initiatives have emerged as pivotal drivers of the nation's economic development. This trend underscores not only Malaysian companies' readiness to expand across borders and engage with international markets but also signifies a strategic move towards achieving economic diversification and stability. In the context of assessing economic growth, DIA serves as a crucial metric, aligning with perspectives observed in countries as mentioned by Agnihotri & Arora, 2019. Theoretically, DIA also involves investment abroad with the goal of finding efficiency, resources, markets, and strategic assets (Dunning, 1993). This article explores the intricacies of Malaysia's DIA dynamics, unravelling its historical evolution, current landscape, while also addressing challenges, opportunities, and profound impacts on the nation's economy.

Historical Context of DIA

Malaysia's journey into international economic engagement begins with a strategic policy shift and progressive economic reforms. Transitioning from an export-focused economy, Malaysia is now actively encouraging overseas investment. In the early 1990s, Malaysia entered an era of significant changes in its economic approach. Prior to that, the main focus of the country lay in the development of the domestic economy with a special emphasis on the industrial sector, notably in Manufacturing and Exports. However, Malaysia has since shifted its investment paradigm by engaging in DIA, aligning with the Government's drive to diversify its strategy and pursue new international economic opportunities.

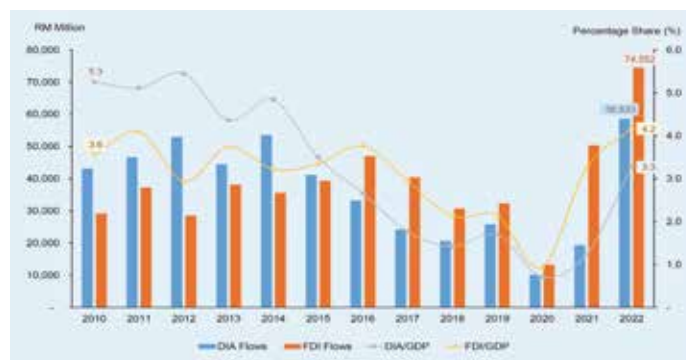
The rapid growth in DIA is an important part of Malaysia's economic transformation. The need to find better sources of raw materials, new markets, and investment opportunities encourages Malaysian companies to actively cross borders, engaging in various sectors such as Services, Real Estate, Manufacturing, and Banking. Concurrently, data indicates that Malaysia ascended from the 11th to the 10th position among the top 15 developing economies in terms of DIA stocks between 1980 and 2013 (UNCTADSTAT 2014). However, Malaysian capital out-flows surpassed in-flows after 2007, rendering Malaysia a net capital exporter (Goh and Wong, 2011). This phenomenon signifies a dynamic evolution in Malaysia's foreign investment landscape, significantly influencing the nation's global economic stature.

DIA's Current Landscape

In the current landscape of the DIA, notable dynamic shifts are occurring alongside the rapid expansion of economic globalisation. This landscape reflects a strategic transformation in the economic approach, where companies are no longer bound by geographical boundaries, but instead engage in international investment as an important element of their growth strategies. The Malaysian Government plays a pivotal role in shaping this landscape, implementing various policies and initiatives aimed at facilitating, supporting, and bolstering companies' access to global markets.

The Cross-Border Investment (CBI) Division under the Ministry of Trade, Investment and Industry (MITI), serves as the function of investment spanning across borders between countries, representing a natural evolution for economically-developed nations. Its significance lies in expanding business horizons and fostering market growth. Malaysian companies are urged to explore beyond borders to enhance market share, seize new investment prospects, and elevate global presence. The Malaysian Government consistently advocates for Malaysian companies to venture abroad, facilitating market expansion, technological acquisitions, and integration into the global production network through CBI.

Chart 1a: Malaysia's DIA and FDI of Flow and Contribution to GDP, 2010 – 2022

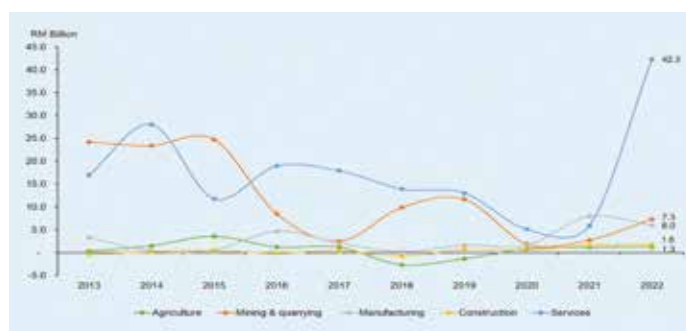


Source: Department of Statistics, Malaysia

The DIA represented about 3.3 per cent of Malaysia's GDP, while Foreign Direct Investment (FDI) comprised 4.2 per cent in 2022. In contrast, back in 2010, FDI only made up 3.6 per cent of Malaysia's GDP whereas DIA stood as high as 5.3 per cent (Chart 1a).

According to the data released by the Department of Statistics Malaysia (DOSM) in Statistics of Malaysia's Direct Investment Abroad 2022, it indicates that the trend of DIA flows in Malaysia are concentrated in the Services sector from 2013 to 2022, followed by the Mining & Quarrying and Manufacturing sectors. (Chart 1b).

Chart 1b: Malaysia's DIA of Flows by Sector, 2013 – 2022



Source: Department of Statistics, Malaysia

As illustrated in Exhibit 1, the Services sector, particularly in Financial activities, emerges as the primary contributor to Malaysia's DIA flows and stock in 2022 with RM42.3 billion (contribution share: 72.2%) and RM412.0 billion (contribution

share: 67.8%) respectively. The country's rapid economic growth and successful development of the domestic economy have facilitated opportunities for overseas investment.

Exhibit 1a: Malaysia's DIA of Flows and Stock by Sector, 2021 – 2022

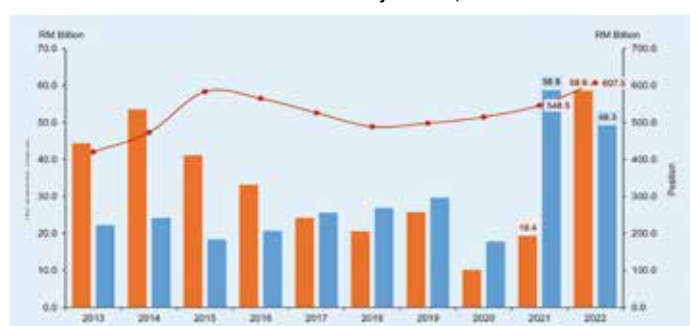


Source: Department of Statistics, Malaysia

Notes.

1. b refers to billion
2. % refers to shares of total
3. Negative value refers to net outflows
4. Sector ranked by net outflows

Chart 1c: Performance of Malaysia's DIA, 2013 – 2022



Source: Department of Statistics, Malaysia

As of 2022, DIA in Malaysia has demonstrated a steady growth, diversifying its investments across various regions and industries. Chart 1c illustrates the performance of DIA of Malaysia from 2013 to 2022. In 2022, DIA registered a notable increase in net outflows, totalling RM58.6 billion compared to RM19.4 billion the previous year, marking the highest since 2014. This surge was primarily driven by increased investments in the Services, Mining & Quarrying, and Manufacturing sectors. Services overtook Manufacturing as a vital sector to DIA, contributing 72.2 per cent of the total investment, primarily in Financial & Insurance/Takaful activities. The Netherlands, Indonesia and Singapore were the main destinations of DIA flows in 2022.

Overall, the accumulated investment abroad surged to RM607.5 billion, mostly in the Services sector, followed by Mining & Quarrying and Manufacturing sectors. Singapore, Indonesia and the Netherlands ranked as the top destinations of the DIA positions in 2022.

In terms of income, DIA registered a value of RM49.3 billion mainly driven by Services and Mining & Quarrying sectors with a combined share of 80.8 per cent of the total income.

DIA from Malaysia continues to show a sustainable trend, with local companies fervently exploring opportunities in the international market. This trend involves not only specific sectors but also diversification into sectors related to high technology, financial services, and natural resources, providing clarity on the existence of various Malaysian investment portfolios around the world. In the aftermath of the COVID-19 pandemic crisis that hit the world in 2020, Malaysia's Direct Investment Abroad trend experienced dynamics that reflected the resilience and adaptation of local companies to the affected economic landscape. Notably, the grand opening of the Battersea Power Station on October 14th, 2022, in the United Kingdom, stands as a testament to Malaysia's post-pandemic investment success. Developed by a Malaysian Consortium that acquired the Power Station's commercial assets for RM8.197 billion, the opening ceremony

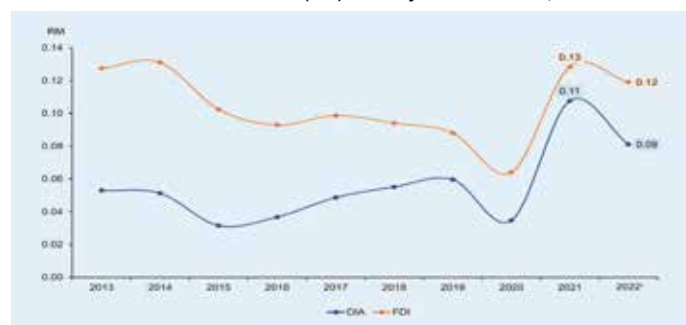
symbolised the success of Malaysian investment abroad post-pandemic.

Amidst the various economic challenges posed by the pandemic, there are intriguing indicators that illustrate the diversification in how Malaysian companies are responding to global uncertainty. According to a study by Bank Negara Malaysia titled «Malaysia's Trade Resilience,» following the easing of COVID-19 restrictions, the Malaysian economy underwent a robust recovery characterised by significant export growth across various sectors. This cross-product recovery exhibited stability and diversification in economic performance, with exceptional performance noted in certain sectors, notably the Electrical and Electronics (E&E) sector, which represented over a third of exports and played a pivotal role in the recovery process. Additionally, the uptick in commodity prices provided further support to commodity-related exports, while the positive correlation with regional economic recovery highlighted Malaysia's significance in the increasingly stable and expanding international trade landscape.

Overall, DIA observed Malaysian companies adapting their investment strategies to navigate current challenges and un-earth new opportunities. The current performance of DIA not only underscores the agility of Malaysian companies in responding to the evolving global economic scenario but also contributes positively to the nation's economic resurgence, and also bolsters the objectives of sustainable economic growth.

Return of Investment (ROI)

Chart 1d: Return on Investment (ROI) for Malaysia's FDI and DIA, 2013 – 2022



Source: Department of Statistics, Malaysia

After the COVID-19 pandemic subsided and the global economy slowly recovered from its impact, further analysis of the income gained on investments in 2022 revealed that both FDI and DIA investors continued to experience high returns on their investments. On average, the return on investment for FDI companies in 2022 slightly decreased to 12 cent from 13 cent in 2021 for every RM1 of investment and conversely, Malaysian companies received eight cents for every RM1 of investment made abroad (Chart 1d).

The Services sector attained the highest income from FDI while the Manufacturing sector secured the highest income from DIA. The rate of return on FDI is higher than investing abroad (DIA), primarily due to the higher profitability of FDI companies in Malaysia. These companies are predominantly engaged in the Electrical & Electronics, Financial, Health, Metal, and Petrochemical industries, which yield greater profits.

Challenges and Opportunities

Investing directly abroad presents Malaysian companies with challenges that require prudent management. Political and economic uncertainties in foreign countries can lead to significant risks, particularly amid frequent changes in the political landscape. Moreover, alterations in policies and regulations within these countries can profoundly impact profits and business operations. Currency exchange risk poses another

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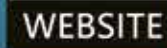
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challenge, necessitating the implementation of an effective risk management strategy to mitigate fluctuations in currency values. Additionally, market diversity, encompassing cultural differences and unique market characteristics, underscores the importance of thorough research to formulate successful international business strategies.

Nevertheless, Direct Investment Abroad also offers various opportunities to enhance the global presence of Malaysian companies. This includes access to broader markets, enabling companies to explore and expand their market share. Furthermore, venturing into foreign markets provides opportunities to acquire the latest technology and innovation, thereby strengthening overall competitiveness and operational agility. In this context, Direct Investment Abroad enables companies to achieve a necessary balance in their investment portfolio amidst market instability in Malaysia, and capitalise on opportunities for sustainable growth.

The future of DIA from Malaysia holds various challenges and opportunities. In this context, Malaysia's strategy to navigate the uncertain global market requires adaptability and resilience. Different investment sectors, such as technology and international co-operation, may witness new growth. The future outlook also emphasises the importance of diversifying investment portfolios to address the ever-changing market risks. It is crucial to ensure that foreign investments support sustainability and generate benefits not only economically but also socially and environmentally.

According to a news excerpt from The Star (January 2024), the Honourable Prime Minister of Malaysia, Yang Amat Berhormat Datuk Seri Anwar Ibrahim, has urged Government-Linked Investment Companies (GLICs) and Government-Linked Companies (GLCs) to reduce their overseas investments and increase their domestic investments. Nevertheless, the Government is prepared to give flexibility to GLCs and GLICs to make investments abroad if there is a need.

The Honourable Prime Minister has also asked the Finance Ministry and Pantau MADANI (i.e., Monitor MADANI) to co-ordinate efforts so that GLICs and GLCs implement strategic investments in line with the New Industrial Master Plan (NIMP) and the National Energy Transition Roadmap (NETR).

Conclusion

In summary, Direct Investment Abroad has emerged as a substantial catalyst for the nation's economic advancement and international impact. Malaysian enterprises, overcoming hurdles and capitalising on opportunities, persist in making a lasting impression on the global arena, buoyed by strategic Governmental backing.

Disclaimer

The views expressed herein are those of the authors and do not necessarily represent the views of DOSM.

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Assessment of Sustainable Development Goals (SDG) Performance Indicators in Malaysia 2022: Are We on Track Towards 2030 Agenda?

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Background of SDG

The United Nations (UN) launched the 2030 Agenda in 2015, which focuses on sustainable development. All 193 UN member states including Malaysia are committed in supporting and implementing the Sustainable Development Goals (SDG) to achieve the set objectives and targets. A Global Indicator Framework consisting of 244 indicators was adopted by the United Nations General Assembly to measure the 17 goals and 169 targets. During the 51st Session of the United Nations Statistical Commission in March 2020, the indicator framework was reviewed, and 247 indicators were adopted while the 53rd Session of the United Nations Statistical Commission in March 2022 stated that the total of current global SDG indicator count is 248 (231 unique indicators).

Implementation of SDG in Malaysia

At the national level, efforts to establish SDG indicators started since 2016 through workshops and series of meetings with relevant Ministries and Agencies. To date, 51 Ministries and Agencies are involved in the development of SDG indicators in Malaysia. The National SDG Governance is established and chaired by YAB (Yang Amat Berhormat, i.e., The Right Honourable) Prime Minister to monitor the implementation of SDG. This demonstrates the nation's serious commitment to achieving a fair, inclusive and sustainable country by adopting the 2030 Agenda as a target in Government policy. Therefore, it is crucial for us to assess the availability and achievement of SDG indicators as these indicators play a crucial role in the measurement, monitoring and success of SDG implementation in the country.

Availability of SDG 2022 Indicators

The availability status of Malaysia's SDG indicators has been progressing from 99 indicators (41%) in 2018 to 175 indicators (71%) in 2021. The availability of indicators has improved further to 195 representing 79 per cent of the global indicators with 20 additional indicators at the national level in 2022 as compared to 2021. At the State level, the availability of indicators was 80 in 2022 as compared to 76 in the previous year. Meanwhile, at the District level, there were 23 available indicators in 2022 as compared to 20 indicators in 2021. The achievement in the availability of SDG indicators showcases Malaysia's commitment in achieving Sustainable Development Goals.

Performance of SDG Indicators by Goal

In the view of the performance of SDG indicators in 2022, out of a total of 195 reported indicators, data for 146 indicators are available for the year 2022. A total of 100 indicators (68%) shows positive increases during that period while the remaining 29 indicators (20%) show negative growth and 17 indicators (12%) show no change. Goal 17 recorded the highest number of positive indicators (with 15 indicators), followed by Goal 16 (10 indicators) and Goal 3 (9 indicators).

Sustainable Development Goal 1 (SDG1) aims to eradicate extreme poverty by 2030. SDG1 includes 13 indicators at the global level and eight (8) indicators are available at the national level in 2022. Among the indicators that have achieved positive targets are SDG 1.4.1 (Access to basic needs), SDG 1.5.1



(Disasters), SDG 1.5.3 (Reduction of disaster risk), SDG 1.5.4 (Local Government disaster risk reduction) and SDG 1.a.2 (Government expenditure on health). Two (2) indicators that recorded negative changes are SDG 1.2.1 (National poverty line) and SDG 1.3.1 (Social protection) while SDG 1.1.1 (International poverty line) remained unchanged. In the Twelfth Malaysia Plan (12MP), Malaysia demonstrates a stronger commitment to addressing poverty issues, particularly through Theme 2 and Driver of Change 6. The primary focus is on transforming approaches to combat persistent poverty by the year 2025.

Sustainable Development Goal 2 (SDG2) sets out to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture. SDG2 encompasses 14 indicators at global level and four (4) indicators are available at the national level in 2022. Three (3) indicators which show positive performances are SDG 2.2.1 (Prevalence of stunting), SDG 2.3.1 (Agricultural productivity) and SDG 2.5.1 (Genetic resources for food). However, SDG 2.2.2 (Prevalence of overweight) records negative performance in 2022. The National Agrofood Policy, 2021-2030 (DAN 2.0) is the Government's initiative to develop a sustainable, resilient and high-tech agri-food sector to drive economic growth, improve the well-being of the people, and prioritise food security and nutrition.

The target of Sustainable Development Goal 3 (SDG3) is to ensure a healthy life and promote well-being at all ages. SDG3 encompasses 28 indicators at global level and 18 indicators are available at the national level in 2022. Nine (9) indicators show positive performances for this goal, namely SDG 3.1.1 (Maternal mortality), SDG 3.1.2 (Trained health personnel), SDG 3.3.5 (Mass drug administration), SDG 3.4.2 (Suicide rate), SDG 3.7.2 (Adolescent birth rate), SDG 3.b.1 (Vaccination coverage), SDG 3.c.1 (Health workforce), SDG 3.d.1 (International Health Regulations) and 3.d.2 (Antimicrobial resistance). Indicators that record negative performances are SDG 3.2.1 (Under-5 mortality), SDG 3.2.2 (Neo-natal mortality), SDG 3.3.2 (Tuberculosis incidence), SDG 3.5.1 (Drug treatment coverage) and SDG 3.6.1 (Road traffic mortality). The Ministry of Health Malaysia (MOH) has prepared the MOH Action Plan 2021-2025 to enhance the country's healthcare system. This Action Plan comprises four cores, namely:

- Core Strategy 1: Strengthening Healthcare Services;
- Core Strategy 2: Enhancing Healthcare Financing;
- Core Strategy 3: Strengthening Health Awareness and Community Empowerment; and
- Core Strategy 4: Leveraging Technology and Innovation in Healthcare.

The target of **Sustainable Development Goal 4 (SDG4)** is to ensure inclusive and equitable quality education. SDG4 encompasses 12 indicators at global level and 10 indicators are available at the national level in 2022. A total of eight (8) indicators show positive performances for this goal, which are SDG 4.1.2 (Completion rate), SDG 4.2.2 (Participation rate in pre-primary education), SDG 4.4.1 (Information and communication technology skills), SDG 4.5.1 (Gender parity index), SDG 4.6.1 (Literacy proficiency level), SDG 4.a.1 (Basic services), SDG 4.b.1 (Official development assistance for scholarships), and SDG 4.c.1 (Qualified teachers). Meanwhile, two (2) indicators show negative performances, which are SDG 4.2.1 (children developmentally on track in health) and SDG 4.3.1 (Youth and adults in formal and non-formal education and training).

The Education Development Plan 2013-2025 has set targets to be achieved in terms of quality, equity and access over a period of 13 years. There are five aspirations for the Malaysian Education System:

- i. Access - 100% enrolment across all education levels from pre-school to upper secondary by the year 2020;
- ii. Quality - The country to be in the top one-third in international assessments, such as TIMSS and PISA, within 15 years;
- iii. Equity - A 50% reduction in achievement gaps (urban-rural, socio-economic, gender) by the year 2020;
- iv. Unity - An education system that offers shared experiences and values to children while appreciating diversity; and
- v. Efficiency - A system that maximizes student success within existing resources

Sustainable Development Goal 5 (SDG5) aims to achieve gender equality, and empower women and girls. SDG5 encompasses 14 indicators at global level and 10 indicators are available at the national level in 2022. Six (6) indicators record positive achievements, namely SDG 5.5.1 (Legal framework), SDG 5.5.2 (Women in managerial positions), SDG 5.6.2 (Adolescent Social and Reproductive Health Policy), SDG 5.a.2 (Land ownership laws), SDG 5.b.1 (Mobile phone ownership) and SDG 5.c.1 (Gender equality system). Two (2) indicators showing negative changes are SDG 5.5.2 (Sexual violence other than intimate partner) and SDG 5.5.1 (Seats held by women in the national parliament). The National Women's Policy implemented in 1989 aims to ensure the development and empowerment of women by mainstreaming women's interests to fully realise their potential in the planning and development of the country, striving for gender equality.

Sustainable Development Goal 6 (SDG6) aims to ensure the availability and sustainable management of water and sanitation for all. SDG6 encompasses 11 indicators at global level and six (6) indicators are available at the national level in 2022. Four (4) indicators record positive achievements for this goal, which are SDG 6.1.1 (Managed drinking water), SDG 6.2.1 (Sanitation services), SDG 6.3.1 (Treated domestic wastewater) and SDG 6.3.2 (Good ambient water quality). Meanwhile, SDG 6.4.2 shows negative achievement (Water stress level), while SDG 6.5.2 (Trans-boundary basin areas) remained unchanged. The National Water Policy 2010-2050 outlines strategic directions and frameworks for strategic actions to ensure the sustainable use and development of water resources for the benefit of the country, its population and the environment

The target of **Sustainable Development Goal 7 (SDG7)** is to ensure access to affordable, reliable, sustainable and modern energy for all. SDG7 encompasses six (6) indicators at global level and two (2) indicators are available at the national level in 2022 with SDG 7.1.2 (Dependency on fossil fuels and clean technology) which recorded a positive achievement while SDG 7.1.1 (Access to electricity) recorded a negative achievement for this goal. The implementation of the National Energy Policy (2022-2040) is a Government initiative to increase the use of clean energy sources in the primary energy-mix.

The target of **Sustainable Development Goal 8 (SDG8)** is to promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all. SDG8 encompasses 16 indicators at global level and 10 indicators are available at the national level in 2022. Seven (7) indicators recorded positive achievements for this goal, namely SDG 8.1.1 (GDP per capita), SDG 8.2.1 (GDP per employees), SDG 8.5.1 (Average earnings), SDG 8.5.2 (Unemployment rate), SDG 8.9.1 (GDP from tourism), SDG 8.10.2 (Having an account in a financial institution) and SDG 8.b.1 (Strategies for youth employment). Conversely, three (3) indicators show negative performances, namely, SDG 8.6.1 (Youth not in education, employment, or training), SDG 8.8.1 (Fatal and non-fatal occupational injuries) and SDG 8.10.1 (Number of commercial bank branches). Economic growth aspects as emphasised in the Twelfth Malaysia Plan (12MP) are the Government's action to enhance the achievement of SDG8.

The target of **Sustainable Development Goal 9 (SDG9)** is to build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation. SDG9 encompasses 12 indicators at global level and six (6) indicators are available at the national level in 2022. Five (5) indicators recorded positive achievements for SDG9, namely, SDG 9.1.2 (Total passengers and freight), SDG 9.2.1 (Value-added in manufacturing), SDG 9.2.2 (Energy use in manufacturing), SDG 9.b.1 (High and medium-tech industries) and SDG 9.c.1 (Mobile network coverage). On the other hand, SDG 9.3.1 (Small-scale industries) posted a negative performance. In response to the Fourth Industrial Revolution (4IR), the National Policy on Industry 4.0 or Industry4WRD, was launched on 31st October 2018, to promote digital transformation in the manufacturing and related service sectors in Malaysia. Meanwhile, the National Transport Policy 2019-2030 aims to develop a sustainable transportation sector that drives economic growth and supports the well-being of the people in line with the country's status as a developed nation.

Sustainable Development Goal 10 (SDG10) aims to reduce inequality within and among countries. SDG10 encompasses 14 indicators at global level and eight (8) indicators are available at the national level in 2022. Five indicators record positive achievements in SDG10, namely, SDG 10.1.1 (Expenditure or income of the lowest 40 percent of the population), SDG 10.2.1 (Population below 50 percent of median income), SDG 10.5.1 (Financial Stability Indicator), SDG 10.7.2 (Migration policy) and SDG 10.a.1 (Zero tariff product). Meanwhile, two (2) indicators show negative performances, which are SDG 10.4.1 (Compensation of employees) and SDG 10.c.1 (Remittance costs).

The target of **Sustainable Development Goal 11 (SDG11)** is to make cities and human settlements inclusive, safe, resilient and sustainable. SDG11 encompasses 15 indicators at global level and 10 indicators are available at the national level in 2022. Eight (8) indicators record positive achievements in SDG11, which are SDG 11.3.1 (Land consumption rate), SDG 11.5.1 (Disasters), SDG 11.6.1 (Waste managed), SDG 11.6.2 (Fine particulate matter levels), SDG 11.7.2 (Victims of sexual harassment), SDG 11.a.1 (National urban policy), SDG 11.b.1 (National disaster risk reduction strategy) and SDG 11.b.2 (Local disaster risk reduction strategy). Meanwhile, the indicator showing negative performance is SDG 11.7.1 (Public open space). The Second National Urbanisation Policy (DPN2) 2016-2025 is the Government's step to ensure sustainable urban development with a focus on balancing the physical, environmental, social, and economic development of the country.

Sustainable Development Goal 12 (SDG12) aims to ensure sustainable consumption and production patterns. SDG12 encompasses 13 indicators at global-level and six (6) indicators are available at the national level in 2022. Three (3) indicators show positive performances, namely, SDG 12.1.1 (Transition policy towards sustainable consumption and production), SDG 12.5.1 (National recycling rate) and SDG 12.7.1 (Policy implementation



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level). Meanwhile, one (1) indicator, SDG 12.4.2 (Hazardous waste), and two (2) indicators, SDG 12.4.1 (International environmental agreements) and SDG 12.b.1 (Implementation of standard accounting tools), each record negative performance and no change, respectively. The Government policy contributing to the achievement of SDG12 is the National Solid Waste Management Policy 2016.

The target of **Sustainable Development Goal 13 (SDG13)** is to take urgent action to combat climate change and its impacts. SDG13 encompasses eight (8) indicators at global level and four (4) indicators are available at the national level in 2022. Four (4) indicators under SDG13 recorded positive performances in 2022. These are SDG 13.1.1 (Disasters), SDG 13.1.2 (National disaster risk reduction strategy), SDG 13.1.3 (Local disaster risk reduction strategy) and SDG 13.2.1 (National climate change strategy). One of the Government's policies supporting the achievement of SDG13 is the National Climate Change Policy.

The target of **Sustainable Development Goal 14 (SDG14)** is to conserve and sustainably use the oceans, seas and marine resources for sustainable development. SDG14 encompasses 10 indicators at global level and eight (8) indicators are available at the national level in 2022. Four indicators achieve positive performance for SDG14, namely, SDG 14.2.1 (Eco-systems of marine areas), SDG 14.3.1 (Marine water quality), SDG 14.b.1 (Small-scale fisheries regulations) and SDG 14.c.1 (International Law of the Sea Convention). One of the Government's policies that can contribute to the achievement of SDG14 is the National Fisheries Development Plan 2021-2030.

The target of **Sustainable Development Goal 15 (SDG15)** is to protect, restore and promote the sustainable use of terrestrial eco-systems, manage forests, combat desertification and, halt and reverse land degradation, and halt bio-diversity loss sustainably. SDG15 includes 14 indicators at global level and five (5) indicators are available at the national level in 2022. Three (3) indicators show positive performances for this goal; they are SDG 15.6.1 (Equitable and fair benefit-sharing policies), SDG 15.8.1 (Preventive or control laws for invasive alien species) and SDG 15.9.1 (Aichi Bio-diversity Target 2). Meanwhile, two (2) indicators indicate negative performances, namely, SDG 15.7.1 (Trade in live wild animals) and SDG 15.C.1 (Trade in live wild animals). One policy that can contribute to the achievement of SDG 15 is the Malaysian Forestry Policy 2021.

Sustainable Development Goal 16 (SDG16) aims to significantly reduce all forms of violence and related death rates worldwide. SDG16 includes 24 indicators at global level and 14 indicators are available at the national level in 2022. There are 10 indicators that show positive performances in SDG16. These are SDG 16.1.1 (Victims of homicide), SDG 16.1.3 (Victims of crime), SDG 16.2.1 (Child abuse), SDG 16.2.2 (Victims of human trafficking), SDG 16.3.1 (Victims of violence), SDG 16.3.2 (Unsentenced detainees), SDG 16.4.2 (Seized weapons), SDG 16.5.1 (Corruption), SDG 16.7.1 (Positions in Government institutions) and SDG 16.a.1 (National human rights institutions). The National Security Policy 2021-2025 is seen as capable of enhancing the achievement of SDG16.

Sustainable Development Goal 17 (SDG17) aims to strengthen implementation methods and re-vitalise Global Co-operation for Sustainable Development. SDG17 includes 24 indicators at global level and 17 indicators are available at the national level in 2022. 15 indicators recorded positive performances in SDG17, namely, SDG 17.1.1 (Government revenue), SDG 17.1.2 (Tax and federal spending revenue), SDG 17.3.1 (Malaysian Technical Co-operation Programme), SDG 17.6.1 (Broadband subscriptions), SDG 17.8.1 (Individuals using the Internet), SDG 17.9.1 (Financial and technical assistance), SDG 17.11.1 (Global export contribution), SDG 17.12.1 (Average tariffs), SDG 17.14.1 (Sustainable development policies), SDG 17.15.1 (Decision-making and planning tools framework), SDG 17.16.1 (Development effectiveness monitoring framework), SDG 17.18.1 (Statistical indicator capacity), SDG 17.18.2 (National statistical

regulations), SDG 17.18.3 (National statistical plans) and SDG 17.19.2 (Population and housing census).

Limitations/Constraints

The performances of SDG indicators discussed in this article, only analyses the perspective of growth or achievement in 2022 as compared to the previous years. National SDG targets need to be established at the target/indicator level to depict the SDG performances to be achieved by the year 2030. With the establishment of these targets, a comprehensive assessment can be conducted to measure the gaps between current target values and the target values that have been set.

Conclusion

The availability of SDG indicators is crucial for measuring the country's performance towards achieving the 2030 Sustainable Development Agenda. Therefore, the collaboration and commitment of all Agencies/Ministries are essential in collecting data to provide high quality indicators for measuring and monitoring the achievements of the Twelfth Malaysia Plan (12MP) which is aligned with the SDG. The increase in the availability of indicators to 79 per cent (195 indicators) in 2022 indicates that the country is moving in the right direction to measure more inclusive SDG achievements to ensure that no one is left behind. The improvement in SDG performance in 2022 provides a preliminary overview of the country's recovery after the global health crisis in 2020 and 2021. Setting SDG targets at the indicator level is also necessary to measure current achievements against the set targets. The Government's efforts to develop the SDG Roadmap Phase 2 demonstrate the nation's commitment to ensuring more effective implementation towards achieving the 2030 Sustainable Development Agenda.

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The full publication of the MESR Volume 12/2023 can be downloaded from the DOSM website at www.dosm.gov.my

Acknowledgment

Source: Department of Statistics, Malaysia (DOSM)

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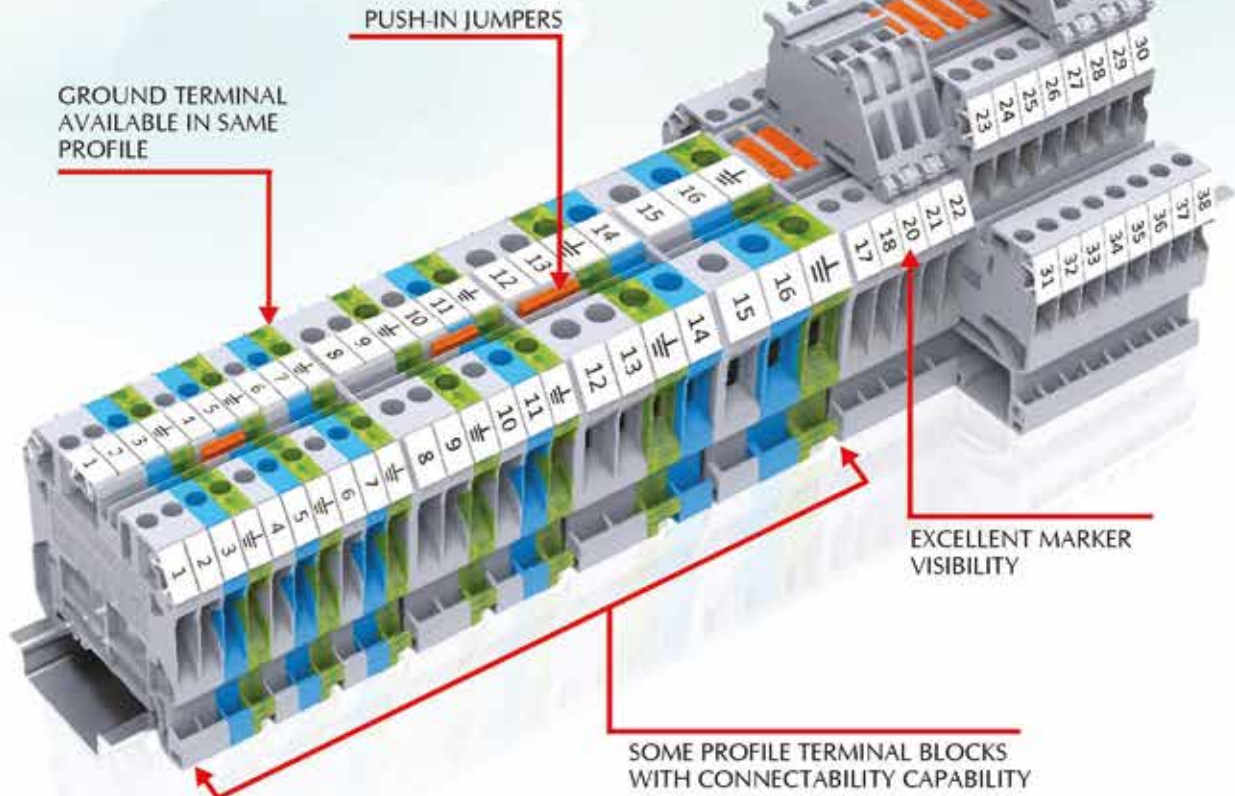
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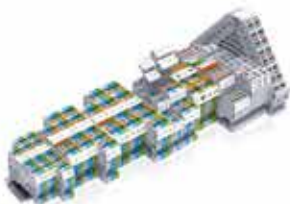
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State Associations News



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Dialogue with TNB Pulau Pinang (Penang)

Penang Electrical Merchants' Association (PEMA) had a fruitful dialogue with Tenaga Nasional Berhad (TNB) on 20 November 2023 at Wisma TNB, Pulau Pinang. PEMA President, Ir. Darren Lee Weng Keen, led a 5-member delegation and met the Head of TNB's Retail Division, Penang State, Ir. Ts. Norhizami Bin Abu Hassan, and his team of seven officials.

Amongst the urgent arising issues discussed were:

- 1) TNB Pulau Pinang's industrial category work schedule, flow chart, new procedures, and application timeframe for MV/HV large power users.
- 2) TNB's requirements and processes for applying to JKR/MPPP for permit approval for road cutting and deposit to JKR & MBPP.
- 3) TNB's schedule of work is constantly delayed resulting in TNB Contractors not being able to start work. TNB also officially required a B4 Chargeman on-site even though the supply from the new sub-station has not been energised.

The dialogue was highly productive with some of the issues being resolved immediately. PEMA expressed its gratitude to TNB for giving the time and opportunity to voice the industry concerns. Both parties hoped that the close working relationship between PEMA and TNB Pulau Pinang will continue to flourish.



One-Day Seminar on Lightning Protection System for Buildings, Design of Capacitor Banks & ATS

The Technical Committee of the Penang Electrical Merchants' Association (PEMA) in association with ABB Malaysia Sdn Bhd, successfully conducted a one-day Seminar on 7 September 2023 at the Eastin Hotel in Queensbay, Penang. The technical topics covered included Lightning Protection Systems for Buildings based on MS IEC 62305 Parts 1-4; the Design of Capacitor Banks for Buildings and Factories based on MS IEC 60831 Parts 1 & 2; Automatic Transfer Switch (ATS) based on MS IEC 60497-6-1; Microprocessor-based Generator; and ATS Controllers. The two Distinguished Presenters in attendance were Mr. S F Ng and Mr. Ritesh Lutchman of Wise Pro Sdn Bhd.

Much earlier, Ir. Darren Lee Weng Keen, the PEMA President, gave a warm welcoming address. The timely Seminar attracted 55 participants and it was approved with BEM CPD hours and CIDB CCD points for Engineers and Contractors.



PEMA Walkathon 2023

The PEMA Walkathon 2023 was successfully held at the Air Itam Dam in Penang on 26 November 2023. According to PEMA Organising Chairman, Mr. Lim Kim San, the purpose of this annual event is to promote health and active living amongst PEMA members and their families. A whopping 200-odd members took part in this highly popular event, together with their families and employees! In addition to delicious food and beverages being served for all, the Walkathon and Lucky Draw winners also received very attractive prizes.





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Chinese New Year Re-union Celebration 2024

The Perak Electrical Association's (PEA's) Chinese New Year Re-union Celebration was held on 16 February 2024 at PEA's premises. They had a Lion Dance, amongst others, to celebrate this auspicious occasion.



PEA at PCCCI's 2024 Chinese New Year Celebration

PEA President, Mr. Wan Kam Weng, together with Vice Presidents, Mr. Richard Wong and Mr. Au Wai Yeen, attended the Chinese New Year Re-union Celebration 2024 of the Perak Chinese Chamber of Commerce & Industry (PCCCI) on 12 February 2024 at Weil Hotel, Ipoh, Perak. It was a merry occasion for all.



Heart Warming Charity Cause

PEA visited several selected welfare organisations on this year's Chap Goh Mei Day, which fell on 24 February 2024, to offer tokens of contribution. They included Majlis Pusat Kebajikan Rumah Sejahtera Daerah Gopeng, Perak; PMA Chan Meng Khor Charity Dialysis Centre; Rumah Sejahtera Jelapang; Persatuan Meningkatkan Akhlak Who Peng Cheang Seah; Hope Haemodialysis Society; Haemodialysis Centre PCSH; Yayasan Dialysis Pendidikan Akhlak Perak; and SJAM-KPS Pusat Hemodialisis Ipoh (Station 15).



PEA at PERDA's 2024 Chinese New Year Gathering

PEA's Committee Members attended the Perak Electrical & Radio Dealers' Association's (PERDA's) 2024 Chinese New Year Gathering, which was held on 2 March 2024 at Mun Choong Restaurant, Ipoh, Perak.



Networking Luncheon with TEEAM

PEA Committee Members had a good Networking Luncheon with TEEAM and Informa Markets' Officials during their Courtesy Visit to Ipoh to promote the ENERtec Asia 2024 Exhibition and the AFEEC & FAPECA Conference 2024 to members of PEA. These industry-centric events are hosted by TEEAM from 26 to 28 June 2024 at the Kuala Lumpur Convention Centre.





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Courtesy Visit from TEEAM

TEEAM paid a Courtesy Visit to the Johor Bahru Electrical & Electronics Association (JBEEA) on 23 February 2024. The visit was for the purpose of networking and also to promote the upcoming ENERtec Asia 2024 Exhibition and the AFEEC & FAPECA Conference 2024, which TEEAM is hosting from 26 to 28 June 2024 at the Kuala Lumpur Convention Centre. TEEAM hopes that JBEEA members will participate in this industry exhibition.



AFEEC & FAPECA 2023 in Singapore

JBEEA Chairman, Mr. Steven Lim, participated in the 47th Anniversary Golf Tournament of the Singapore Electrical Contractors & Licensed Electrical Workers (SECA), which was held at Orchid Country Club, Singapore. He also attended the Farewell Dinner of AFEEC & FAPECA 2023, which was held on 17 November 2023 at The Grassroots' Club, Singapore.



Networking Luncheon with TEEAM

TEEAM had a Networking Luncheon with Committee Members of the Persatuan Kekompeteran Penjaga Jentera & Pendawai Elektrik (PKPPE), Perak (The Perak Electrical Chgeman & Wireman Competence Association) and Perak Electrical Association (PEA) on 28 February 2024. It was timely and a good catch-up on market updates and TEEAM together with Informa Markets briefed both the Associations on the upcoming events: ENERtec Asia 2024 Exhibition, which will be held from 26-28 June 2024 in Kuala Lumpur Convention Centre and the 2024 Conference of the ASEAN Federation of Electrical Engineering Contractors (AFEEC) and Federation of Asia Pacific Electrical Contractors Associations (FAPECA) which will also be held during that time. Members of PKPPE and PEA are cordially invited to support and participate in these two important industry events in Kuala Lumpur.



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Meeting with SESB

The President of Sandakan Electrical Engineering Association (SEEA), Sabah, Mr. Chin Ket Hiung, led a delegation of members to attend a meeting with Officers of the Sabah Electricity Sdn Bhd (SESB) Headquarters and the Metering Department on 12 June 2023.





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EASS AGM 2024

The Annual General Meeting (AGM) 2024 of the Electrical Association of Sarawak and Sabah (EASS) was successfully held on 31 March 2024 at SCCC's premises. During the AGM, Education Awards were presented by EASS Chairman, Mr. Hii Hua Chuon, to members' children who had excelled in their Examinations.



Electrical Safety Seminar

TEEAM President, Ir. Chang Yew Cheong, was cordially invited as one of the five Guest Speakers at EASS's Electrical Safety Seminar, which was successfully held on 10 December 2023 at the University of Technology Sarawak. Ir. Chang received a Token of Appreciation from EASS President, Mr Hii Hua Chuon. A whopping 210 participants attended the fruitful Safety Seminar which stressed upon the life-and-death matter of Electrical Safety!



Smart City Summit & Expo 2024, Taiwan

EASS visited the Smart City Summit & Expo 2024 which was held from 19 to 22 March 2024 at the Taipei Nangang Exhibition Centre, Taiwan. The highlight was the Business-Matching Sessions organised by the Taipei Computer Association (TCA). It was a good exposure to the Taiwanese market for the 10-member delegation of EASS.



Study Tour to Hainan Island, China

In line with the concept of Sustainable Development and Learning, EASS ably organised a Study Tour to Hainan Island, China, from 4 to 9 November 2023. The delegation of 10-members was led by EASS Chairman, Mr Hii Hua Chuan. It was a very fruitful trip as the EASS Delegation learnt more about the Electrical System and various Electrical Products in Hainan. They also visited a Bamboo Charcoal Factory to learn about the Bamboo Charcoal product, which is environmental-friendly.



SolaRIS – Solar for Rakyat Incentive Scheme

The Ministry of Energy Transition and Water Transformation (PETRA) has recently introduced a Solar Incentive Scheme i.e. Solar for Rakyat (The People) Incentive Scheme or SolaRIS -- to encourage the installation of Solar Photo-Voltaic (PV) Systems by domestic users under the Net Energy Metering (NEM) Programme.

The Minister of Energy Transition and Water Transformation, who is also the Deputy Prime Minister, the Right Honourable (Yang Amat Berhormat) Datuk Seri Fadillah Yusof, in a Press Statement said that Solar PV installation in residential premises by domestic users represents a "quick win" in Putrajaya's bid to boost its Renewable Energy (RE) efforts. "Considering its significant potential, the installation of Solar PV Systems in residential premises should be expanded to support the Government's efforts to increase RE capacity in the Electricity Supply System to 70% by 2050, and to reduce carbon emissions from the electricity supply sector," he said.

SolaRIS will offer a rebate of up to RM4,000 per kiloWatt alternating current (kWac) to new Net Energy Metering (NEM) users who submit NEM applications to the Sustainable Energy Development Authority (SEDA) Malaysia from 1 April 2024. The scheme, which will be administered by Tenaga Nasional Bhd (TNB), is open to all Malaysian citizens with a one-time limit per individual, who is a TNB account holder, as well as first-time applicant for the NEM Rakyat Programme.

It is worth noting that the rebate is based on a "first come, first served" basis for NEM quotas applied from 1 April to 31 December 2024. Meanwhile, NEM Rakyat applications obtained must be operational no later than 31 March 2025, or until all SolaRIS rebate quotas are exhausted.

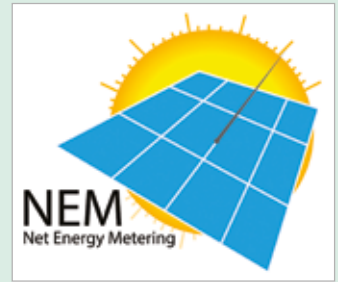
"The rebate payment will only be made after the installation and operation of the Solar PV System under the NEM Rakyat

Programme, in the name of the bill holder, and will be deposited into the user's local bank account, subject to the terms and conditions of the claim," he said.

To further expand public involvement in RE, the Minister added that the Government has also agreed to approve an additional quota of 100 MegaWatts (MW) under the NEM Rakyat Programme, increasing the allocated quota to 350MW. Applications for quotas for the NEM Rakyat Programme are open until 31 December 2024, or until all allocated rebate quotas are exhausted, whichever comes first.

"With these provisions, PETRA believes that SolaRIS can attract more domestic users to participate and benefit from the installation of Solar Systems in residential premises, thereby contributing to energy transition aspirations and the country's carbon-neutral targets by 2050," he added.

For TEEAM members who are interested in installing Solar Panels at your residential premises, be sure to apply to the NEM 3.0 Programme under SEDA for the installation via the SolaRIS initiative. Link: <https://www.seda.gov.my>



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Smart City Summit & Expo 2024, Taiwan

The Vice Chairman of the Sarawak Electrical Association (SEA), Dato' Sri Ir. Peter Lu, visited the Smart City Summit & Expo 2024, which was held from 19 to 22 March 2024 at the Taipei Nangang Exhibition Centre, Taiwan. The Expo showcased the Taiwanese Government's Policies and Initiatives for Net-Zero Emissions, as well as demonstrating the Policies of all their Government Ministries promoting National and Industrial Green Transformation. It was very informative and a good platform to source for Taiwanese Products and Services.



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Most Innovative Product Award
by Middle East Lighting Design Summit 2018



Participation Award
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New Members

The following new members have been approved and accepted by the TEEAM Council from October 2023 to April 2024. A warm welcome to all the new members and special appreciation is extended to those who introduced these new members. For those who are not yet members, why wait? Join us and find out how our Association can offer our value-added services to you and your highly esteemed Companies!

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The Evolution of Solar PV and Battery Energy Storage Systems and its Innovations: Driving Energy Sustainability

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This Technical Paper was presented by Ir. Chow Pui Hee representing TEEAM Malaysia at the 2023 AFEEC & FAPECA Conference themed Green Technologies for the Built Environment, which was held on 15 November 2023 at the Marina Bay Sands Convention & Exhibition Centre, Singapore.

Abstract

This paper explores the transformative journey of solar photovoltaic (PV) technology and battery energy storage systems (BESS) in shaping the landscape of sustainable energy generation. Since the advent of renewable energy, solar power has emerged as a vital source of clean and sustainable energy. Solar PV systems have played an important role in harnessing the transition towards renewable energy, owing to their increasing efficiency, declining costs, and scalable nature. This has led to their widespread adoption across various sectors, including residential, commercial, and utility-scale applications. Today, the deployment of solar PV system has successfully led to the significant reduction of carbon emissions, fostering energy independence, and driving the transition towards a clean energy future. However, due to numerous supply issues from solar sources, innovative advancements in BESS have emerged, which have revolutionised the integration of renewable energy sources into the grid. The existence of transformative impact of BESS technologies has been proven in enhancing grid stability, enabling energy management, and facilitating the widespread deployment of intermittent renewable energy resources. In addition to that, the introduction of BESS has exerted the full potential of solar PV systems, allowing for energy storage, demand response, and load shifting capabilities. The synergistic relationship between solar PV and battery energy storage systems demonstrated that the integration of these technologies promotes a sustainable energy eco-system that maximizes energy generation and its efficiency while minimizes reliance on fossil fuels, and further fosters grid resilience. As for the recommendation of this paper, the significant technological enhancement in both solar PV and BESS symbolises the need for policy-makers to roll out the policies in the affirmative to the development of these industries. Solar PV and BESS are inherently interdependent catalysts in the pursuit of energy sustainability. These technologies rely on a symbiotic relationship, wherein solar PV systems provide renewable energy generation, while BESS ensures efficient energy utilisation and management. Together, they form a cohesive framework that drives the transition towards a sustainable energy future.

1. Introduction

The global energy landscape is currently undergoing dramatic change primarily driven by the immediate need for sustainability in the context of climate change and the dwindling reserves of fossil fuels. Energy sustainability has risen to the forefront as one of the most formidable challenges of our time. Heavy dependence on fossil fuels for power generation has given rise to escalating levels of greenhouse gas emissions, air pollution, and the degradation of our ecosystems (Frederica, 2017; Lazarus & van Asselt, 2019). These environmental consequences pose an immediate and severe threat to the delicate balance of our planet and the well-being of both present and future generations. The

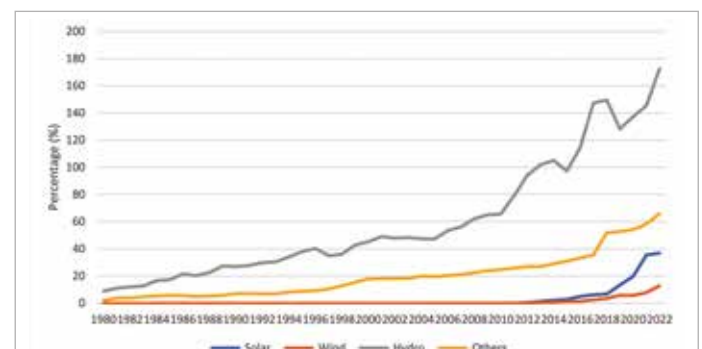
transition to sustainable energy will not be easy, but it is essential. We need to make a concerted effort to invest in sustainable energy technologies and to make them more affordable.

The need for energy sustainability is one of the most pressing challenges of our time. Our reliance on fossil fuels for power generation has led to climate change, air pollution, and environmental degradation. These consequences pose an immediate threat to the planet and its inhabitants. The transition to sustainable energy sources is no longer a choice but a moral, environmental, and economic imperative. In this context, solar photovoltaic (PV) systems and battery energy storage systems (BESS) have emerged as key players in the quest for a cleaner, more sustainable future. This paper explores the evolution of PV and BESS technologies and their innovations, highlighting their essential roles in advancing global energy sustainability.

In recent years, South-east Asia has witnessed a dynamic and multi-faceted energy trend marked by a discernible transition towards greater sustainability and energy diversification. This transformation is characterised by a notable surge in renewable energy development such as solar, biomass, biogas, wind, and hydro which is primarily driven by concerns over environmental sustainability and a desire to reduce carbon emissions. As a result of that, Governments and industries in the region are escalating their efforts to enhance energy-efficiency and grid reliability, aiming to meet the growing energy demands of their rapidly urbanising populations while reducing energy wastage. However, South-east Asia's energy landscape remains complex and multi-faceted, as many countries in the region continue to rely heavily on fossil fuels, particularly coal and natural gas as the core resources for power generation, to meet their immediate energy needs. The growth of renewable energy in South-east Asia is challenging the region's reliance on fossil fuels, forcing Governments and industries to strike a delicate balance between economic development, energy security and environmental sustainability.

Figure 1 depicts the composition of renewable energy generation in South-east Asia: hydropower stood at the highest amongst all, indicating that the proportion of the other renewable energies remains relatively low. Overall, the increasing trend of the composition of renewable energy implies that the progress of energy transition held significant development.

Figure 1: South-east Asia Electricity Generation by Sources



Source: ourworldindata.org

*The countries selected consist of Malaysia, Singapore, Thailand, Vietnam, Indonesia and the Philippines.



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2. The Development of Solar Photovoltaic (PV)

Solar PV technology has captured the imagination of public alike. The fundamental concept is elegantly simple; which is to harness the boundless energy radiating from the sun and convert it into electricity with minimal environmental impact. Over the past decades, solar PV has evolved from a niche technology to a global energy giant. Advances in materials, manufacturing processes, and system design have led to increased efficiency, reduced costs and greater accessibility, making solar PV a pivotal player in the quest for sustainable energy solutions. While solar PV offers a renewable energy source, its intermittent nature presents challenges for grid stability and energy reliability. As such, there are many researchers who have proposed methods to deal with this common issue and enhance its robustness (Thomas et. Al., 2013; Jeroen et. Al., 2013).

The revolution of Solar PV is a testament to human ingenuity. From the early explorations of the photo-voltaic effect to the sophisticated multi-junction solar cells capable of capturing sunlight with remarkable efficiency, the journey has been nothing short of astonishing. Over the decades, solar PV has evolved from a curiosity to a cornerstone of global renewable energy initiatives. Advancements in materials science, manufacturing techniques and system design have led to efficiency improvement, cost reduction, and broader accessibility. Today, solar PV installations span continents, harnessing the Sun's abundant energy to power homes, industries and entire regions.

3. The Evolution of Solar Photovoltaic (PV) and BESS Technology

The evolution of solar photovoltaic (PV) technology and battery energy storage systems (BESS) has been a subject of extensive research and innovation over the past few decades (Lingling et. al., 2023; Neelakantha et. al., 2023; Kokchang, et al., 2023). Solar PV technology traces its roots back to the mid-20th century, with the discovery of the photo-voltaic effect. Notable milestones in its evolution include:

- 1954: Bell Labs' scientists Gerald Pearson, Calvin Fuller, and Daryl Chapin developed the first practical solar cell with an achievement of 6% efficiency rate
- 1970s: The development of mono-crystalline and poly-crystalline silicon solar cells led to the cost reduction and improvement in efficiency
- 1990s: Thin-film solar technologies such as amorphous silicon and cadmium telluride, emerge as alternatives, further diversifying the PV landscape
- 2000s: Innovations like bi-facial solar panels, concentrated solar photovoltaics (CPV), and tandem solar cells contribute to higher efficiency and energy capture

These advancements have collectively propelled solar PV into a prominent position as a clean and renewable energy source. Battery energy storage systems have undergone remarkable developments enabling the efficient capture and storage of electricity generated from renewable sources. Key development in BESS technology include:

- 1970s-1980s: Early BESS technologies emerge with applications in remote power systems and satellites.
- 2000s: Advancements in lithium-ion battery technology led to higher energy density, longer cycle life and lower costs, making BESS more commercially practical for various applications.
- 2010s: Grid-scale BESS installations become more prevalent, offering solutions for peak load management, grid stabilisation, and renewable energy integration.

Recent innovations such as solid-state batteries, flow batteries, and advanced energy management systems are opening new frontiers for BESS. These developments in BESS technology

have unlocked the potential to store excess energy from intermittent renewable sources, and ensure a stable and reliable energy supply.

4. Solar PV Efficiency

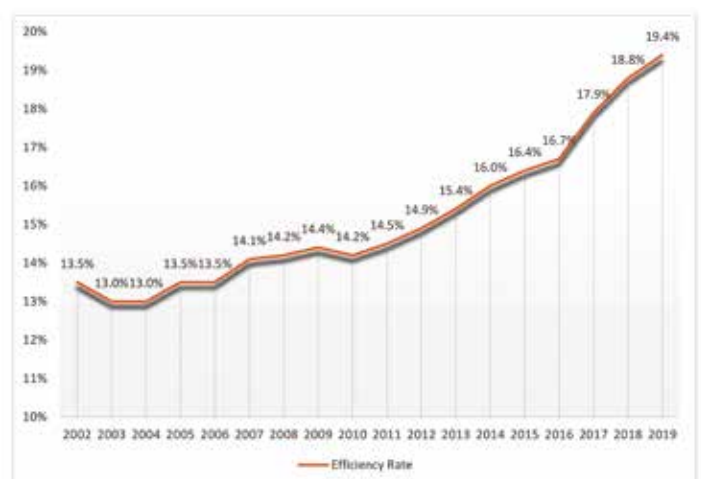
In recent years, there have been significant enhancements in solar PV efficiency, rendering this technology increasingly appealing for a diverse array of applications. Figure 2 illustrates the increase in solar PV efficiency over the past two decades. As shown in Figure 2, the efficiency of solar PV panels has steadily improved, with recent innovations pushing beyond 20% efficiency in laboratory settings. These advancements translate into increased energy capture and reduced land requirements for solar installations, further enhancing their sustainability.

Figure 2: Solar PV Efficiency Trends Best Research-Cell Efficiency Chart



Source: National Renewable Energy Laboratory (NREL)

Figure 3: Median Solar Panel Efficiency Rate Over Time



Source: 2022 Lawrence Berkeley National Laboratory (LBNL)

Tracking the Sun Report

Figure 3 indicates the trend of solar panel efficiency rate from 2002 to 2019; the data published demonstrated a remarkable and consistent upward trajectory. In 2002, the median efficiency of solar panels was relatively modest, with an average efficiency rate of 14%. However, as technological advancements and research in photo-voltaics flourished, the efficiency of solar panels experienced a significant increase. By 2019, the median efficiency had soared to 20%, signifying a nearly 6% improvement over the examined period. This substantial enhancement in solar panel efficiency can be attributed to a multitude of factors, including breakthroughs in materials science, the development of more sophisticated manufacturing processes, and the refinement of solar cell designs. These advancements have not only made solar energy more accessible and affordable but have also contributed significantly to the global shift towards renewable energy sources and a reduced carbon footprint. As a result, the solar industry has become a pivotal player in the sustainable energy landscape, offering a cleaner and more efficient energy solution for a greener future.



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5. Battery Energy Storage Systems (BESS) Deployment

BESS technology has witnessed remarkable growth, enabling the efficient capture and storage of excess solar energy for later use, even when the sun is not shining. BESS enhances the resilience and reliability of renewable energy sources, making them viable alternatives to conventional fossil fuel-based power generation. Researchers, engineers and entrepreneurs continuously seek novel solutions to enhance efficiency, reduce costs and expand the scope of applications for these technologies. These innovations are not only fostering the growth of renewable energy but also reshaping entire energy eco-systems, offering new opportunities for de-centralisation, grid modernization and increased energy independence.

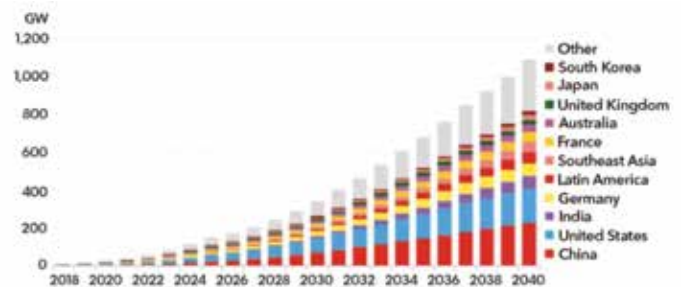
Battery Energy Storage Systems (BESS) have found a multitude of applications across various sectors, revolutionising the way we harness and manage energy in storage. As presented in Table 1, application of BESS has been found to exist in numerous sectors such as grid-related utility, grid-related residential and commercial & industrial (C&I). Within the framework of environmentally-friendly energy sources, BESS plays a vital role in stabilising the intermittent output of sources like solar and wind, thus providing grid operators with greater flexibility and reliability. Furthermore, BESS are instrumental in peak shaving, thus helping commercial and industrial facilities reduce their electricity bills by storing excess energy during low-demand periods, and discharging it during high-demand hours. Beyond the energy sector, BESS finds use in enhancing resilience during power outages, serving as back-up power sources for critical infrastructure such as hospitals and data centers. Additionally, BESS can help integrate electric vehicles into the grid by enabling efficient charging and discharging of EV batteries. As the technology continues to develop, BESS applications are expected to expand even further, contributing to a more resilient, efficient and sustainable energy system.

Table 1: Application of BESS

Sector Category	Application	Description
Grid-related – utility	Ancillary services	Provision or absorption of short bursts of power to maintain supply and demand, and thus the frequency of the grid; frequency regulation and reserves
	Peaking capacity	Provision of capacity to meet system maximum demand Driven by increasing system flexibility needs. Energy storage is charged during low prices and surplus supply and discharged to meet demand. Batteries can be charged from surplus renewable energy or from assets that, along with battery, become dispatchable
	Energy-shifting	
	Transmission-level	Use of an energy storage system as an alternative to traditional network re-inforcement, such as to meet an incremental increase in transmission capacity instead of an expensive transmission line upgrade
	Distribution-level	Use of an energy storage system as an alternative to traditional network re-inforcement, such as to meet an incremental increase in distribution capacity instead of an expensive distribution of line upgrade
Grid-related – residential	C&I energy storage	Energy storage that is used to increase the rate of self-consumption of a PV system from a commercial or industrial customer
Grid-related – utility/residential and C&I	EV charging infrastructure	

Source: U.S. Department of Energy (Energy Storage Grand Challenge: Energy Storage Market Report, 2020)

Figure 3: Global Cumulative Energy Storage Installations Projection

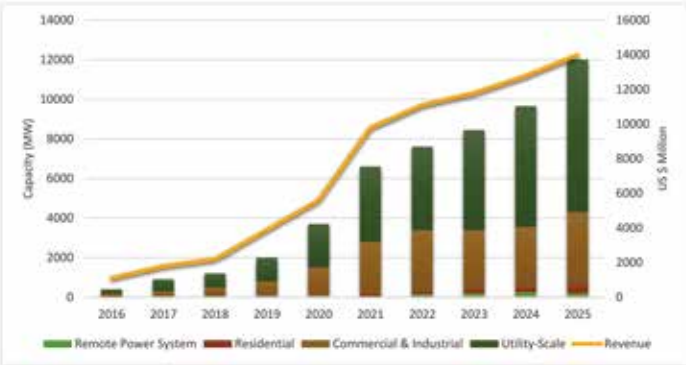


Source: Bloomberg NEF

Based on the data published by Bloomberg NEF, global energy storage installation is projected to increase tremendously till 2040 due to the rapid change in the demand of green energy as well as the commitment towards net zero by a majority of the countries around the World. Figure 3 reveals that the energy storage installation could exceed 1000GWh by 2040. As commented by Logan Goldie-Scot, Head of Energy Storage at BNEF renewables-plus-storage, especially solar-plus-storage, has become a major driver for battery build in the near term.

Battery energy storage is considered as a critical technology in the transition towards sustainable energy. The declining price and increasing use of lithium-ion batteries is proven by the declining price, especially in electric vehicles and renewable projects within the region. In the next three years, the World Bank forecasts that approximately 10 GW storage capacity might be realised. Although most of the projected 10 GW capacity would probably be contributed by pumped hydro storage, it deemed battery technologies are beginning to make impacts. But for this to happen, there must be an energy storage target as most countries in ASEAN do not have rules regarding the storage or fundamental commercial structures to support such emerging technologies (The ASEAN Post). Government support in terms of policies, regulations and laws are now in the spotlight as the push for the adoption of energy storage takes place. The regulatory uncertainties pose an obstacle to equity investors and debt funders regarding deploying these essential technologies.

Figure 4: Projected annual stationary energy storage deployments, power capacity and revenue, forecasted segment



Source: World Bank

Figure 4 illustrates the exponential growth of grid-connected BESS installations over the past decade. This expansion is driven by regulatory support, falling battery costs, and the need for reliable energy storage solutions in renewable-rich regions. The driving factors behind the deployment of BESS facilitation since 2016 are projected to continue their upward trends; energy transition associated with the reliable energy supply is a must to ensure that there is no intermittency for the electricity supply.

6. Driving Sustainability: Solar and Battery Energy Storage System (BESS)

Understanding the evolution and innovations in solar PV and BESS is crucial in a global context. Nations worldwide are setting ambitious renewable energy targets and actively seeking ways to reduce their carbon footprints. Solar PV and BESS play a central role in accelerating the transition; offering scalable and adaptable solutions that can be tailored to the specific needs of diverse regions and communities. While in the on-going search for eco-friendly energy options, the domains of Solar Photovoltaic (PV) and Battery Energy Storage Systems (BESS) have emerged as transformative forces, re-writing the narrative of global energy production and consumption. The urgent need to address climate change, dwindling fossil fuel resources, and the imperative of achieving



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the United Nations Sustainable Development Goal 7 (SDG 7) -- ensuring access to affordable, reliable, sustainable, and modern energy for all -- has propelled solar PV and BESS to the forefront of technological innovation.

Integrating Battery Energy Storage Systems (BESS) with renewable energy sources, such as solar and wind, offers multifaceted advantages. BESS plays a pivotal role in enhancing grid stability and reliability, maximising energy utilisation, promoting energy independence and de-centralisation, and delivering significant environmental and economic benefits. One of the most notable benefits of combining BESS with solar photovoltaic (PV) systems is the substantial improvement in grid stability and reliability. Solar power generation is inherently intermittent, relying on weather conditions and daylight hours. By coupling solar arrays with BESS, excess energy can be captured during sunny periods, and released during low or no sunlight, effectively mitigating fluctuations and providing a consistent energy supply to the grid. This stability benefits utility companies, ensuring uninterrupted power supply for homes and businesses, reducing the risk of blackouts, and enhancing overall energy resilience.

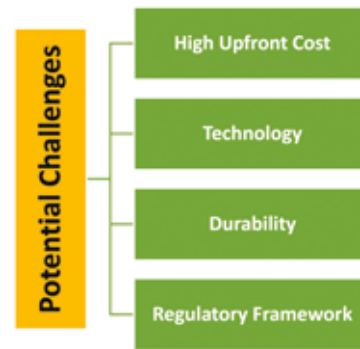
BESS serves as an energy buffer, enabling efficient utilisation of solar-generated power. Solar PV systems often produce surplus energy during peak sunlight hours when electricity demand may be low. Without storage, this excess energy is typically wasted. BESS, on the other hand, captures and stores surplus energy for later use, optimising the use of clean, renewable resources. Home owners and businesses can rely on stored solar energy during night time or cloudy days, thus reducing their dependence on conventional grid power and lowering electricity costs. The integration of solar PV and BESS empowers individuals, communities, and businesses to achieve greater energy independence and de-centralisation. A well-designed system enables users to generate, store and consume their renewable energy, thus reducing reliance on centralised fossil fuel-based power generation. This not only contributes to a greener planet but also enhances energy security by reducing vulnerability to disruptions in the central grid.

The economic benefits are substantial as well; BESS smooths out energy supply and demand variations, potentially lowering electricity costs for consumers while creating opportunities for revenue generation through grid services such as peak-shaving and frequency regulation. In summary, Battery Energy Storage Systems complement solar power in numerous ways, including grid stability, energy utilisation, energy independence, and environmental and economic benefits. This synergy not only advances sustainability goals but also positions these technologies as essential components of a cleaner and more resilient energy future.

7. Potential Challenges for BESS Deployment

Notwithstanding, there are numerous benefits of having integrated Solar PV and Battery Energy Storage System -- but still, there are challenges for the dissemination of BESS within South-east Asia. First and foremost, the cost to be incurred for BESS remains relatively high given that the technology involved is new in the region. This can make it difficult for businesses and Governments to justify the investment, especially in countries with limited financial resources. Apart from that, the lifespan of BESS batteries is typically shorter than other power generation technologies, such as solar and wind. This implies that BESS needs to be replaced more often, which can increase the overall long-term investment cost. Due to the BESS system being relatively complex involving Energy Management System (EMS) and Battery Management System (BMS), therefore, expertise in this industry might be scarce. For instance, BESS needs to be able to efficiently store and discharge energy, and they need to be able to withstand harsh weather conditions. More importantly, the evolving regulatory framework can make it difficult for businesses and Governments to plan and invest in BESS projects.

Figure 5: Potential Challenges for BESS Deployment



Despite these challenges, there are several reasons to be optimistic about the future of BESS in South-east Asia. The region is home to a growing population and economy, which is driving demand for energy. Renewable energy is also becoming more affordable and accessible, which is creating an opportunity for BESS to play a role in the region's energy mix. As technology continues to develop and the costs are exhibiting a downward trend, BESS are likely to become more widespread in Southeast Asia.

8. Environmental and Economic Benefits of Solar PV and BESS Integration

Extensive research has consistently highlighted the compelling environmental and economic advantages of seamlessly integrating solar photovoltaic (PV) systems and Battery Energy Storage Systems (BESS) into modern energy systems. A wealth of key findings underscores the remarkable Environmental Benefits of this integration. Solar PV, for instance, has been demonstrated to significantly reduce greenhouse gas emissions, curbing the impact of climate change. Additionally, it helps mitigate air pollution and conserves precious water resources, particularly when compared to conventional fossil fuel-based power generation methods. It has been demonstrated that BESS helps mitigate the intermittents of solar energy, enhancing grid stability and reducing the need for back-up fossil fuel power plants (MA, et al., 2021; Chaffee, 2023). The falling costs of solar PV and BESS technologies are making renewable energy more cost competitive. Grid operators will benefit from reduced infrastructure costs and improved energy management, while consumers can achieve energy savings and increased energy independence.

9. Conclusion and Implications

The exploration of the evolution of solar photovoltaic (PV) technology and battery energy storage systems (BESS) reveals a promising trajectory toward a more sustainable energy future. The innovations discussed in this paper showcase the potential for these technologies to revolutionise the way we generate, store, and utilise energy. As we continue to confront the challenges of climate change and finite fossil fuel resources, the importance of renewable energy sources cannot be overstated. Solar PV and BESS, with their growing efficiencies, declining costs, and increasing accessibility, are poised to play a pivotal role in reducing greenhouse gas emissions and enhancing energy resilience.

The journey from the early days of solar PV to the sophisticated battery energy storage systems of today underscores the remarkable progress made in harnessing clean and abundant energy from the sun. Additionally, ongoing research and development efforts promise even greater advancements in the future, making these technologies increasingly practical and economically-viable from the investor perspective. It is crucial that we continue to invest in research, development, and policy

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initiatives that support the widespread adoption of solar PV and BESS. By doing so, we can accelerate the transition to a more sustainable, clean energy landscape, and contribute to a brighter and more environmentally-responsible future for generations to come.

In order to facilitate the growth of Solar PV and BESS, it is deemed crucial for Governments to provide financial incentives to businesses or relevant Government bodies to invest in new BESS technology. By having this in place, it can help to reduce the upfront costs and make BESS more affordable. Additionally, Governments can work to secure a reliable supply of raw materials for BESS. This can help to reduce the risk of supply disruptions and make BESS more sustainable. Moreover, R&D can be conducted to improve the performance and lifespan of BESS batteries. This can help to reduce the overall cost of BESS and make them more attractive to businesses and Governments. Standards and regulations can be developed to create a more favorable environment for BESS deployment. This can help to reduce uncertainty and make it easier for businesses and Governments to invest in BESS projects. By addressing these challenges, South-east Asia can position itself as a leader in the development and deployment of BESS. This can help the region to strategically meet its energy needs in a sustainable and affordable way.

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Ir. Chow Pui Hee graduated in 2001 from Universiti Putra Malaysia with a Bachelors of Engineering (Chemical) (Honours). She was elected as a member of the Institution of Engineers, Malaysia, in 2014. She is a registered Professional Engineer with Practicing Certificate in Chemical Engineering with the Board of Engineers Malaysia since 2016; an Environmental Impact Assessment (Wastewater) Subject Consultant with the Department of Environment Malaysia since 2010, and an Electricity Energy Manager with Energy Commission Malaysia since 2016. She also holds a Certificate of Competency for Grid-Connected Photovoltaics ("PV") Systems Design by Sustainable Energy Development Authority (SEDA) issued in 2014. She brings with her approximately 21 years of experience in the engineering field, Renewable Energy and the environmental sectors.



She started her career in 2001 with Waterfield Sdn Bhd as an Application Engineer where she was mainly involved in specifying pumping system for water and wastewater treatment plants. In 2002, she joined Aquakimia Sdn Bhd as an Environmental Sales Engineer, where she was mainly responsible for engineering design and project management, and subsequently promoted to Manager, Environmental Division in 2007, where she was involved in the design and build of wastewater treatment plants. Subsequently in 2009, she joined Climate Change Group Sdn Bhd as a Technical Manager where she was responsible for the management of land-fill closure and provision of technical advisory services of contaminated land management, solid waste and wastewater management. In 2010, she became Senior Technical Manager at Strec Sdn Bhd where she was responsible for providing environmental consulting services. Subsequently, between 2011 and 2014, she joined Teknik Edisi Sdn Bhd as an Assistant General Manager where she was responsible in the implementation of several solar PV system projects.

In July 2014, she joined Samaiden Sdn Bhd as General Manager before assuming the role as the Managing Director in April 2018. Since July 2014, she has been spear-heading the growth and expansion of the company from a contractor of solar PV system to providing end-to-end services for solar PV power plant projects covering Front-end Consultancy, Engineering, Procurement, Construction & Commissioning ("EPCC") and Operation & Maintenance ("O&M") services. Presently, she has assumed the role of Group Managing Director in Samaiden Group Berhad.

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TEEAM Badminton Tournament 2023

Twenty-nine pairs of Men's Doubles, fourteen Men's Singles and twelve pairs of Mixed-Doubles vied for the TEEAM Badminton Tournament 2023 Championship. The Tournament was held on Saturday and Sunday, 16 and 17 December 2023, at the Tropicana Badminton Training Centre, Sungai Buloh, Selangor. All participants showed their strong fighting spirit right until the last game. The Tournament was very smoothly-run with the expert assistance of Professional Referees and Umpires. A big thank you to the TEEAM Badminton Sub-Committee Head, Datuk Jacky Chen, and his strong Sub-Committee for their enormous efforts in organising this overwhelmingly-received Tournament. There were also fabulous lucky draws for the Tournament participants. Some of the attractive prizes were sponsored by SB Elektrik & Elektronik and Stardex Trading, amongst others. Everyone present truly enjoyed the Tournament. Syabas and well done! The Men's Doubles Champions were Gallen Loh Yee Hin of Omron Electronics and Joshua Lee Man Hou of Saffire. The Men's Singles Champion was Saw Hong Junn of Sunway Engineering. Mixed Doubles Champions were Ea Jia Gen and Sany Tan Suet Nie of Schneider Electric. Our heartiest congratulations to all the Winners and Participants!





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Semi-Finalist

Siow Yi Fang
Individual Member
Trophy + RM400

Semi-Finalist

Tan Kian Huat
Individual Member
Trophy + RM400

Men's Doubles Event

Champion

Joshua Lee Man Hon & Gallen Loh Yee Hin
Saffire Sdn Bhd & Omron Electronics Sdn Bhd, Trophies + RM1,200

Runner-up

Tan Kian Huat & Wong Chin Peng
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Semi-Finalists

Khoo Soo Han & Lim Chin Siong
Multi Wire Sdn Bhd & STE Electrical Sdn Bhd, Trophies + RM400

Semi-Finalists

Lim Sheng Kim & Saw Hong Junn
Sunway Engineering Sdn Bhd
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Mixed Doubles Event

Champion

Ea Jia Gen & Sany Tan Suet Nie
Schneider Electric Industries (M) Sdn Bhd, Trophies + RM800

Runner-up

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Malaysian Economic Statistics Review

Volume 2/2024

Key Reviews & Overviews

The Department of Statistics, Malaysia (DOSM) had recently released the Malaysian Economic Statistics Review (MESR) Volume 2/2024 on 29 February 2024. This volume offers a comprehensive overview of the economic landscape in January and February 2024, along with insights into the statistics for the fourth quarter of 2023. The MESR will assist users and readers to have the latest information on the economic performance, and in much greater detail.

Key Reviews

- The January 2024 World Economic Outlook Update by the IMF predicts a global growth rate of 3.1 per cent in 2024, with a modest uptick to 3.2 per cent in 2025. Despite this, the forecast falls below the historical average of 3.8 per cent from 2000 to 2019, attributed to constrained monetary policies, reduced fiscal support, and sluggish productivity growth. Advanced economies are expected to experience a growth from 1.6 per cent in 2023 to 1.5 per cent in 2024, followed by an increase to 1.8 per cent in 2025, while emerging market and developing economies are projected to grow at 4.1 per cent in 2024 and rise to 4.2 per cent in 2025.
- In the fourth quarter of 2023, Malaysia's economy expanded by 3.0 per cent, a slower pace compared to the 3.3 per cent growth in the previous quarter. However, the seasonally adjusted GDP contracted by 2.1 per cent as opposed to 2.6 per cent in the third quarter of 2023. Monthly economic performance showed growth of 3.9 per cent and 3.8 per cent for October and November respectively, before slowing down to 1.4 per cent in December. Throughout this quarter, the Services sector continued to be the primary driver of supply-side performance, with all sectors, except Manufacturing, recording positive growth.
- Natural rubber production declined marginally by 0.7 per cent year-on-year to record 30,342 tonnes in December 2023 (December 2022: 30,556 tonnes). On a monthly basis, there was a 1.1 per cent decline from 30,669 tonnes in November 2023. However, the overall performance in the fourth quarter of 2023 exhibited a 3.9 per cent increase over the same period in 2022, totalling to 90,399 tonnes. The Oil Palm Fresh Fruit Bunches production in January 2024 increased 3.1 per cent to 7,353,307 tonnes in contrast to January 2023 (7,134,941 tonnes). Nevertheless, the monthly production recorded a 7.5 per cent decrease compared to December 2023 (7,949,669 tonnes).
- In the meantime, Malaysia's Industrial Production Index (IPI) recorded a slight year-on-year decline of 0.1 per cent in December 2023, following a positive growth of 0.6 per cent in the preceding month. This downturn was primarily due to a contraction in the Manufacturing sector, which recorded a negative 1.4 per cent compared to a negative 0.1 per cent in November 2023. In the fourth quarter of 2023, the IPI registered an increase of 1.0 per cent year-on-year compared to the negative 0.05 per cent recorded in the third quarter of 2023.
- The Manufacturing sector's sales value dropped by 4.2 per cent year-on-year to RM149.9 billion in December 2023 from 2.6 per cent decline in the preceding month. This decrease was chiefly influenced by the continuous decline in the Petroleum, Chemical, Rubber & Plastic Products sub-sector since June 2023 which recorded a negative 13.6 per cent in December 2023 (November 2023: -10.8%). Moreover, the Electrical & Electronics Products; and Food, Beverages & Tobacco sub-sectors recorded a drop of 4.6 per cent and 2.6 per cent respectively. In the fourth quarter of 2023, the Total Sales Value displayed a consistent deceleration for three consecutive quarters, declining by 2.7 per cent year-on-year to reach RM461.5 billion (Q3 2023: -2.9%).
- Simultaneously, Malaysia's Services sector in the fourth quarter of 2023 recorded a revenue of RM591.4 billion, a 6.6 per cent year-on-year increase and the Services Volume Index rose 4.1 per cent to 148.5 points. These growths were contributed by the Wholesale & Retail Trade, Food & Beverage and Accommodation segment with a 5.9 per cent increase in revenue amounting to RM450.9 billion and the Volume Index recorded a 4.2 per cent rise to 150.2 points.
- Looking at the prices front, Malaysia's inflation rate remained stable at 1.5 per cent in December 2023 with the index points reaching 131.2 as against 129.2 in the corresponding month of the previous year. This growth was influenced by a moderate increase in Restaurants & Hotels, 3.7 per cent (November 2023: 4.3%); Food & Non-Alcoholic Beverages, 2.3 per cent (November 2023: 2.6%) and Housing, Water, Electricity, Gas & Other Fuels, 1.6 per cent (November 2023: 1.7%). The inflation for the fourth quarter of 2023 eased to 1.6 per cent as compared to the fourth quarter of 2022 (3.9%). As for January 2024, the inflation remained at 1.5 per cent, the same rate since November 2023 with the index points recorded at 131.4 as against 129.5 in the same month of the previous year.
- The Producer Price Index (PPI) on an annual basis continued to decrease by negative 1.3 per cent in December 2023 compared to negative 1.5 per cent in November 2023. The decrease was attributed to the Mining sector which decreased by negative 3.4 per cent (November 2023: -4.7%). This was followed by declines in Manufacturing and Electricity & Gas Supply sectors. In the fourth quarter of 2023, PPI Local Production recorded a decrease of 1.0 per cent (Q3 2023: -1.4%). The decline was due to the Mining (-2.5%), Manufacturing (-1.2%) and Electricity & Gas Supply (-0.5%) sectors. The PPI continued to decline, registering a negative 0.6 per cent in January 2024.
- In terms of cross-border transactions, Malaysia's Current Account Balance recorded RM253.4 million in the fourth quarter of 2023, narrowing from RM27.5 billion in the same quarter of the previous year. The lower surplus was due to a wider deficit in the Primary Income Account.
- Foreign Direct Investment (FDI) recorded a lower net inflow of RM17.1 billion as compared to RM19.2 billion for the fourth quarter of the preceding year. Meanwhile, Direct Investment Abroad (DIA) posted a lower net outflow of RM12.4 billion in Q4 2023 as against RM28.5 billion in Q4 2022.
- Malaysia's Merchandise Trade sustained a negative trajectory in the fourth quarter of 2023, contracting by 3.2 per cent to RM695.6 billion compared to RM718.3 billion in Q4 2022. This decline was attributed to a 6.9 per cent decrease in exports to RM366.3 billion, partially offset by a 1.3 per cent increase in imports to RM329.3 billion. Subsequently, the trade balance posted a surplus of RM36.9 billion, shrinking by 45.9 per cent compared to the corresponding period last year. In January 2024, the Total Trade showed a double-digit growth of 13.3 per cent, rising from RM207.2 billion in January 2023 to RM234.7 billion. Exports increased 8.7 per cent to RM122.4 billion, while Imports grew even faster by 18.8 per cent to RM112.3 billion,

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resulting in 44.2 per cent contraction in trade surplus from the previous year, to RM10.1 billion.

- Malaysia's Labour scenario in Q4 2023 showed a drop of 3.3 per cent or 0.3 percentage points in the Unemployment Rate compared to the same quarter last year (Q4 2022: 3.6%). The Number of Unemployed declined by 5.9 per cent during the quarter. This decrease was driven by continued Employment growth, which increased by 2.5 per cent year-on-year, while the Labour Force increased by 2.2 per cent year-on-year to reach 16.91 million persons, maintaining a high Labour Force Participation Rate of 70.1 per cent.
- The Leading Index re-bounded with a positive trajectory, showing a 0.3 per cent growth to reach 110.1 points in December 2023, compared to 109.8 points in the same month of the previous year. This marked the first positive growth after nine consecutive months of declines, driven by a substantial surge of 41.5 per cent in the Number of Housing Units Approved. Despite remaining below the trend at 100.0 points, the smoothed growth rate of the LI for December 2023 indicates expectations of improved economic performance in the near term, supported by resilient domestic demand and stable labour market conditions.

Overview of the World Economy

The World Economy Outlook Update published in January 2024 by the International Monetary Fund (IMF) projects global growth at 3.1 per cent in 2024 and a moderate rise to 3.2 per cent in 2025. However, the forecast for global growth in 2024 and 2025 is below the historical annual average of 3.8 per cent between 2000 and 2019, reflecting constrained monetary policies, the withdrawal of fiscal support, and sluggish underlying productivity growth. The forecast growth in advanced economies is expected to decline slightly from 1.6 per cent in 2023 to 1.5 per cent in 2024 followed by an increase to 1.8 per cent in 2025. Meanwhile, Emerging Markets and Developing Economies (EMDEs) are anticipated to grow at 4.1 per cent in 2024 and increase to 4.2 per cent in 2025.

In most regions, inflation is declining more rapidly than expected as the supply-side issues are being resolved and monetary policy is being tightened, with the global headline Inflation Rate anticipated to fall to 5.8 per cent in 2024 and 4.4 per cent in 2025. The anticipated slowing of economic growth is likely to weigh on employment prospects in many regions, coinciding with a rise in the Global Unemployment Rate from 5.1 per cent in 2023 to 5.2 per cent in 2024. The projections for Global Trade Growth Rates for 2024 and 2025 are 3.3 per cent and 3.6 per cent respectively, falling below the historical average of 4.9 per cent. Unresolved trade tensions between the largest trading partners and geopolitical conflicts are expected to persist and impact global trade levels. The economic performance of some selected countries for the fourth quarter of 2023 and the whole year of 2023 is shown in Table 1.

Table 1: GDP Growth Rate of Selected Countries, Year-on-Year (%), 2022 - 2023

Country	2021	2022	2022	2023			
			Q4	Q1	Q2	Q3	Q4
Malaysia	8.7	3.7	7.1	5.6	2.9	3.3	3.0
Spain	5.8	2.5	3.8	4.1	2.0	1.9	2.0
United Kingdom	4.3	0.1	0.6	0.3	0.3	0.2	-0.2
United States	1.9	2.5	0.7	1.7	2.4	2.9	3.1
Japan	1.0	1.9	0.5	2.6	2.3	1.7	1.0
South Korea	2.6	1.4	1.4	0.9	0.9	1.4	2.2
Hong Kong	-3.5	3.2	-4.1	2.9	1.5	4.1	4.3
Taiwan	2.6	1.4	-0.7	-3.5	1.4	2.3	5.1
Singapore	3.8	1.1	2.4	0.5	0.5	1.0	2.2
China	3.0	5.2	2.9	4.5	6.3	4.9	5.2
Thailand	2.5	1.9	1.4	2.6	1.8	1.4	1.7
Philippines	7.6	5.6	7.1	6.4	4.3	6.0	5.6
Indonesia	5.3	5.1	5.0	5.0	5.2	4.9	5.0
Vietnam	8.0	5.1	5.9	3.4	4.3	5.5	6.7

Source: National Statistics Office of selected countries

According to GDP advanced estimate, the United States (US) economy grew by 3.1 per cent in the fourth quarter of 2023. Concurrently, the US economy increased 2.5 per cent in 2023 as against 1.9 per cent in 2022. The growth was mainly driven by higher Consumer Spending, Non-Residential Fixed Investment, State and Local Government Spending, Exports and Federal Government Spending, partially offset by declines in Residential Fixed Investment and Inventory Investment.

The National Bureau of the United Kingdom (UK) estimated that Gross Domestic Product (GDP) shrank 0.2 per cent in the fourth quarter of 2023. Hence, the UK's economy is estimated to have increased by 0.1 per cent in 2023, following from a growth of 4.3 per cent in 2022. This is the lowest GDP since the financial crisis in 2009, excluding the year of 2020 due to the COVID-19 pandemic.

Looking at the economic situation in the fourth quarter of 2023, China's economy further expanded with the growth of 5.2 per cent as against 4.9 per cent in the preceding quarter. The Services sector supported the growth by 5.8 per cent with Accommodation & Catering which grew at 14.5 per cent and Information Transmission, Software & Information Technology services increased by 11.9 per cent in the fourth quarter of 2023. In the ASEAN region, the Indonesian economy grew at 5.0 per cent in the fourth quarter of 2023 supported by Household Consumption, and surged by 4.5 per cent due to increased mobility during the recent Christmas and New Year festive periods, along with stable public purchasing power and growing consumer confidence. For the whole year of 2023, Indonesia's economy recorded a growth of 5.1 per cent, supported by all industries, especially Transportation and Storage, which increased by 10.3 per cent on the production side.

The Philippines' economy recorded a growth of 5.6 per cent in 2023, following an expansion of 5.6 per cent in the fourth quarter of 2023. The growth was supported by Wholesale and Retail Trade, and Repair of Motor Vehicles and Motorcycles, which grew by 5.5 per cent.

Overview of Malaysia's Economy

Malaysia's economy grew at 3.0 per cent in the fourth quarter of 2023, from a growth of 3.3 per cent in the preceding quarter. However, GDP in quarterly change contracted by 2.1 per cent (Q3 2023: 2.6%) in terms of seasonally adjusted. The monthly economic performance grew 3.9 per cent and 3.8 per cent for October and November respectively, before slower to 1.4 per cent in December.

The Services sector remained the main driver of the overall performance of the supply side in this quarter, with all sectors registering positive growth except for Manufacturing, as outlined in Table 2.

Table 2: Annual Percentage Change (%) of Malaysia's GDP by Kind of Economic Activity, 2022 - 2023 and Q1 2022 - Q4 2023

Kind of Economy Activity	2022	2023	2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GDP	8.7	3.7	4.8	3.9	16.1	7.1	5.8	2.9	3.3	3.0
Services	10.9	5.3	6.4	11.9	16.7	9.1	7.3	4.7	5.0	4.2
Mining & quarrying	2.6	1.0	-2.2	-1.7	9.1	6.3	2.4	-2.3	-0.1	3.8
Construction	5.0	6.1	-6.1	2.5	15.3	10.1	7.4	6.2	7.2	3.6
Agriculture	0.1	0.7	0.1	-2.3	1.2	1.1	1.0	-1.0	0.9	1.9
Manufacturing	8.1	0.7	6.7	9.2	13.1	3.9	3.2	0.1	-0.1	-0.3

Source: Department of Statistics, Malaysia

The **Services** sector posted a growth of 4.2 per cent, from 5.0 per cent in the preceding quarter, primarily attributed to the modest growth in the Wholesale and Retail Trade sub-sector at 4.4 per cent. Furthermore, the Transportation & Storage and Business Services sub-sectors recorded strong growth of 12.2 per cent and 8.2 per cent, respectively. Nonetheless, the Services sector in quarterly change, contracted by 2.4 per cent (Q3 2023: 2.1%) in terms of seasonally-adjusted.

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The **Mining and Quarrying** sector turned around with a growth of 3.8 per cent in this quarter as compared to a decline of 0.1 per cent in the preceding quarter. The turn-around was fuelled by the surge in the Natural Gas sub-sector at 4.6 per cent. In terms of seasonally adjusted, this sector eased to 1.5 per cent (Q3 2023: 8.6%).

The **Construction** sector rose 3.6 per cent from 7.2 per cent in the third quarter of 2023. The performance was propelled by robust growth in Civil Engineering at 16.8 per cent. On quarter-on-quarter seasonally-adjusted, this sector contracted 7.3 per cent (Q3 2023: 3.7%).

The **Agriculture** sector grew at 1.9 per cent in the fourth quarter of 2023, as compared to 0.9 per cent in the preceding quarter, supported by the Oil Palm sub-sector with the increase of 1.6 per cent. Additionally, Fishing and Rubber sub-sectors rebounded in this quarter with the growth of 4.4 per cent and 3.8 per cent, respectively. In terms of seasonally-adjusted, this sector increased 3.5 per cent (Q3 2023: 4.6%).

Meanwhile, the **Manufacturing** sector fell 0.3 per cent (Q3 2023: -0.1%) in the fourth quarter of 2023, influenced by Electrical, Electronics and Optical Products which further declined 6.0 per cent. The contraction of the Manufacturing sector was cushioned by the growth in Vegetable and Animal Oils & Fats and Food Processing, as well as Non-metallic Mineral Products, Basic Metal & Fabricated Metal Products, at 7.2 per cent and 6.2 per cent, respectively. In terms of seasonally-adjusted, the Manufacturing sector decreased 2.9 per cent (Q3 2023: 1.5%).

Table 3: Annual Percentage Change (%) of Malaysia's GDP by Type of Expenditure, 2022 - 2023 and Q1 2022 - Q4 2023

Type of Expenditure	2022	2023	2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GDP	8.7	3.7	4.8	5.3	14.1	7.1	5.8	2.8	3.3	3.0
Private final consumption expenditure	11.2	4.7	5.3	10.3	14.8	7.3	5.9	4.3	4.6	4.2
Gross fixed capital formation	6.8	5.5	0.1	5.8	13.1	8.8	4.9	5.5	5.1	6.4
Government final consumption expenditure	4.5	3.9	6.9	2.3	6.5	3.0	-2.2	3.8	5.8	7.3
Export	14.5	-7.9	12.3	15.0	21.5	8.6	-3.3	-9.4	-12.0	-6.3
Import	15.9	-7.6	16.1	20.1	21.1	7.2	-6.5	-9.7	-11.1	-2.9
Net export	-1.0	-11.3	-26.9	-29.0	26.2	23.0	54.4	-3.7	-22.7	-35.6

Source: Department of Statistics, Malaysia

Private Final Consumption or Household Expenditure, which contributed 58.9 per cent of GDP, increased 4.2 per cent (Q3 2023: 4.6%), backed by higher expenditures in Transport (10.1%), Food & Non-alcoholic Beverages (5.9%) and Housing, Water, Electricity, Gas & Other Fuels (5.6%). On quarter-on-quarter seasonally-adjusted, Private Final Consumption Expenditure posted a decrease of 3.0 per cent (Q3 2023: -0.7%).

Gross Fixed Capital Formation (GFCF) expanded to 6.4 per cent (Q3 2023: 5.1%) in this quarter. The performance of GFCF was contributed by Machinery & Equipment (9.7%), and Structure (4.3%). Furthermore, GFCF by sector showed that both the Public and Private sectors recorded increases in the fourth quarter of 2023. On a quarter-on-quarter seasonally-adjusted, the GFCF registered an increase of 0.3 per cent (Q3 2023: 1.8%).

Both Exports and Imports declined by 6.3 per cent (Q3 2023: -12.0%) and 2.9 per cent (Q3 2023: -11.1%), respectively. Thus, Net Exports continued to decline by 35.6 per cent as compared to a decrease of 22.7 per cent in the preceding quarter.

Overall, Malaysia's economy expanded by 3.7 per cent for the year 2023. The Services sector was the primary driver of this performance, with 5.3 per cent growth, followed by the Construction (6.1%) and Manufacturing (0.7%) sectors.

Additionally, the Mining & Quarrying and Agriculture sectors grew 1.0 per cent and 0.7 per cent, respectively.

From the demand perspective, the economic growth was attributed to the Private Final Consumption at 4.7 per cent, followed by GFCF (5.5%) and Government Final Consumption (3.9%). In contrast, both Exports and Imports declined by 7.9 per cent and 7.6 per cent respectively, resulting in Net Exports further decreasing by 11.3 per cent in 2023.

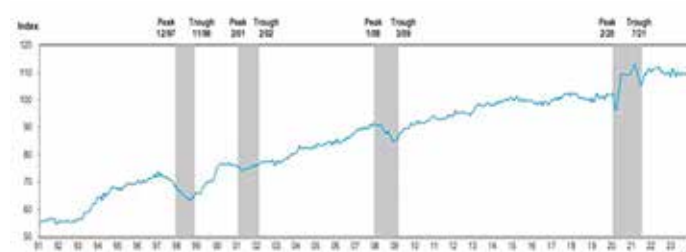
Malaysia's Current Account Balance (CAB) posted a surplus of RM253.4 million in the fourth quarter of 2023, compared to RM9.1 billion recorded in the previous quarter. The surplus in the fourth quarter of 2023 was primarily attributed to a significant deficit in the Primary Income Account. For the year 2023, the CAB reached a surplus of RM22.8 billion, down from RM55.1 billion the previous year. Concurrently, Foreign Direct Investment (FDI) net inflow surged from RM7.2 billion to RM17.1 billion in the fourth quarter of 2023. Meanwhile, Direct Investment Abroad (DIA) recorded a net outflow of RM12.4 billion in the fourth quarter of 2023, compared to RM13.4 billion in the preceding quarter.

Malaysia's Total Trade decreased by 3.2 per cent in the fourth quarter of 2023. Exports values declined by 6.9 per cent to RM366.3 billion, while Imports increased by 1.3 per cent to RM329.3 billion. On the other hand, Malaysia's Trade Balance remained in surplus with a value of RM36.9 billion, declining 45.9 per cent compared to the same quarter last year. Exports, Imports, Total Trade and Trade Surplus posted negative growth for the period of January to December 2023 as compared to the same period last year.

The Malaysia Labour Force in the fourth quarter of 2023 continued to expand 0.5 per cent to register 16.91 million persons. Subsequently, the Labour Force Participation Rate (FPR) remained unchanged at 70.1 per cent in this quarter. Additionally, the Number of Employed Persons remained on a positive trend in the fourth quarter of 2023, with an increase of 0.6 per cent, to 16.35 million persons. Furthermore, the Number of Unemployed continued to decline 1.4 per cent to register 565.0 thousand persons and the Unemployed Rate also decreased, to 3.3 per cent.

Malaysia's economic growth is expected to show better performance in the second quarter of 2024 supported by the Leading Index which bounced back to a positive trajectory of 0.3 per cent to attain 110.1 points in December 2023 as compared to 109.8 points in the same month of the preceding year. This was the first positive growth after nine consecutive months of declines, driven by a surge in the Number of Housing Units Approved (41.5%). In the context of monthly performance, the LI also increased 0.3 per cent, contributed by the Bursa Malaysia Industrial Index and Number of Housing Units Approved, accounting for 0.5 per cent, respectively. The smoothed growth rate of the LI for December 2023 remained below the 100.0 points trend. Although it remained below the trend, the Malaysian economy is expected to demonstrate improved performance in the near term supported by resilient domestic demand and stable labour market conditions.

Chart 1: Leading Index (2015=100) and Business Cycle (Grey Shaded Areas), January 1991 to September 2023



Source: Department of Statistics, Malaysia

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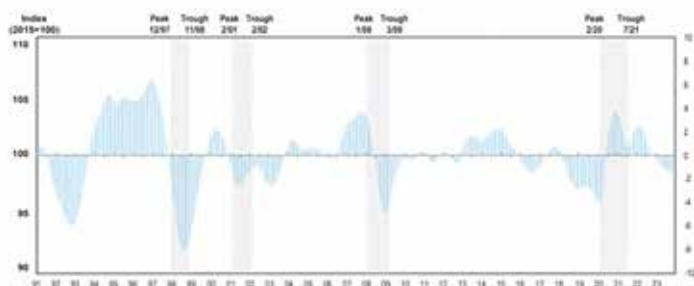
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Chart 2: Leading Composite Index (Long Term Trend = 100) and Business Cycle (Grey Shaded Areas), January 1991 December 2023



Source: Department of Statistics, Malaysia

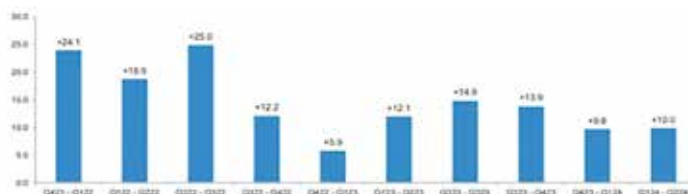
Chart 3: Quarterly Confidence Indicator, Malaysia, 2022 – 2024



Source: Department of Statistics, Malaysia

With a positive confidence indicator of 4.2 per cent in the first quarter of 2024, businesses are optimistic about the business environment, maintaining an upward trend since third quarter of 2023. Business conditions for the first quarter 2024 are expected to be better across all industries. Looking forward,

Chart 4: Net Balance of Business Performance Expectation For Upcoming Six Months By Sector, Malaysia, 2022 – 2024



Source: Department of Statistics, Malaysia

business perception for the first half of 2024 is seen to be improving, with a net balance of +10.0 per cent as opposed to +9.8 per cent recorded previously, with all sectors exhibiting positive signs.

The full publication of the MESR Volume 2/2024 can be downloaded from the DOSM website at www.dosm.gov.my

Acknowledgment

Source: Department of Statistics, Malaysia (DOSM)

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- No Special App/Software required
- Use of internal WebServer to view via standard web browser
- Can connect up to 20 DPM on one port
- With two RS485 ports

- System can be further integrated into web server and online monitoring capabilities for high level monitoring
- Please contact us for more info

Existing Network (ETH)

Existing Wifi Network

Use Modem for Remote Sites

Direct to Smartphone (via Hotspot)

- Direct Connection to hand phone via AP available
- Easy to access and download data
- Good for Energy Managers and charge man who require data logging (15 min intervals)
- Data downloaded in .csv files which can be opened using excel applications



Monitoring



Web Server



Wise Pro Sdn Bhd 199601008707 (NO.381055P)

No. 8, Pusat Teknologi Sinar Meranti, Jalan IMP 1/3, Taman Industri Meranti Perdana, 47120 Puchong, Selangor
Tel : +603-8066 6491/6492/6493 Fax : +603-8052 6649 (Sales) Mobile No. +6017-492 1474, +6012-543 5515

Surge Protection Devices



Model-DV M TT



**5 YEARS
WARRANTY**

**Protection against lightning
current amplitude 200 kA (10/350 μ s)**



Section of DEHNventil[®]
spark gap

- **Combine Type I & II** - encapsulated (non-exhausting) triggered spark - gap technology
- Extremely low voltage protection level (U_p) ≤ 1.5 kV for terminal equipment
- Type tested for Easy Coordination to equipment Type 1 + Type 2 + Type 3 (≤ 5 m)
- High short - circuit current withstand capability (I_{SCCR}) of 50 kA_{rms} to 100 kA_{rms}
- Type tested by **KEMA** to the latest IEC61643 -1/-11

Power Factor Capacitor



**5 YEARS
WARRANTY**

**Impregnated with a dielectric fluid,
non hazardous, bio-degradable vegetable oil.**

- Higher partial discharge appearance level (Added Insulation)
- Excellent corona protection
- Higher dielectric resistance to transient current & voltage
- A greater gas absorption capacity
- A moisture barrier
- Low thermal resistance to overcome HIGH loads

TUV certified to IEC60831-1 & -2

**Protection Against Case Rupture Even Without
Series Reactor in HIGH HARMONIC distortion conditions
Proven " Long Life Expentancy" Projects > 10Years**

Epson Toyocom, Taiyo Uden, Penfibre, Hospital Besar, New Strait Time, Telekom Exchange, NSCC, Compound, Mid-Valley, Jaya Jusco, Western Digital, P.U.B. Johor River, Mines Mall, Kaneka, Maltrad, Sirim, UiTM, Mimos, Ajinomoto, SamLing Plywood Factory, Wisma UOA, Lot 10, etc.



Model-RG2
(1.5mm T Steel Case)



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(NO.381055P)

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