

NGTP Strategic Thrust 04

## RESEARCH & INNOVATION

Innovation is at the core of all emerging technologies. It catalyses growth by providing better, more effective solutions for increased productivity and operational efficiency. Innovation in green technology is vital to ensure economic advancement is resource-efficient and does not create a negative impact on the environment. A decade since its inception, MGTC has been focusing on cultivating a culture of innovation and providing accessibility to the public of the latest green technologies.

### CULTIVATING AN INNOVATIVE CULTURE

MGTC nurtures youth and aspiring entrepreneurs through innovative and experiential mindset-changing programmes. These include the Green Tech Youth Innovation Challenge, Journey to Astana and Eco Biz Challenge aimed at tertiary-level students; and the Green Minds Challenge Programme for secondary students. The overall objective is to inculcate a green mindset and stimulate creativity amongst youth to be innovation-driven in solving real-life environmental problems.

### Youth Programmes

#### Green Tech Youth Innovation Challenge (GTYIC)

The inaugural GTYIC challenged tertiary-level students to develop solutions to environmental issues using design thinking skills and 3-D mechanical design. Organised in collaboration with Asia School of Business-MIT Sloan School of Management (ASB-MIT), the 2016 challenge, themed "Greening Your Home", attracted the participation of 40 students in 10 teams. The winning teams represented Monash University, Asia Pacific University and Universiti Kebangsaan Malaysia.



Winner of Green Tech Youth Innovation Challenge  
Organised by MGTC - Monash University



Runner Up of Green Tech Youth Innovation Challenge  
Organised by MGTC - Asia Pacific University



### The GTYIC Challenges

are organised for tertiary-level students to develop solutions to environmental issues using

### Design Thinking Skills And 3-D Mechanical Design

## Journey to Astana (JTA)

JTA provided Malaysian youth and university researchers the opportunity to showcase their technological products and educational programmes at the International Expo 2017 in Astana. Organised jointly by MGTC, the Ministry of Energy, Green Technology and Water (KeTTHA) and Ministry of Higher Education (MoHE), JTA saw 25 students and 19 lecturers from 15 public and private universities enter 13 end-stage commercialised products and six educational programmes at the expo held from 10 June to 10 September 2017 in the capital of Kazakhstan. Special events were organised weekly for delegates to present their products and programmes. A key highlight was a visit to Astana's most prestigious research university, Nazarbayev University.

Upon returning from their trip, JTA delegates shared their experience and knowledge gained on sustainable development with peers at:

- A symposium held at Universiti Institut Teknologi MARA Shah Alam campus
- Six symposiums during IGEM 2017, held in Kuala Lumpur Convention Centre



### Astana EXPO 2017

provided Malaysian youth and university researchers a platform to showcase their technological products and educational programmes



Visit to Nazarbayev University - Astana's most prestigious research university



Delegates presenting their products/ programmes at Astana EXPO 2017



Symposium at UiTM Shah Alam

## Eco-Biz Dream Project Challenge



The Eco-Biz Dream Project was initiated in 2016 to inspire and empower students to develop business ideas that have a positive impact on the environment, thus developing entrepreneurial skills with a sustainability mindset. Co-organised by MGTC and Alliance Bank Malaysia Berhad (ABMB), the programme has to date challenged more than 300 tertiary students to identify solutions for environmental problems in Malaysia.

A total of 125 students participated in the 2018 programme themed "Revitalising Kerayong River in Kuala Lumpur". University Malaysia Sarawak emerged as the champion, receiving RM10,000 in cash with their winning solution using 'BioChar' in a plug-and-clean filter for use at wet markets along Kerayong River. The team also received an additional RM200,000 seed funding to implement their idea from Alliance Islamic Bank Berhad.



A platform for Tertiary Students to Compete and Identify Solutions for Environmental Problems in Malaysia



2018 Eco Biz - Winner

## Green Minds Challenge



MGTC developed the Green Minds Challenge (GMC) in 2016 in partnership with the Malaysian Mensa Society to inspire secondary school students to think about and develop simple solutions to environmental issues. The focus is on minimising consumption of natural resources at schools such as water and energy through effective waste management, recycling and composting, among others.

The inaugural programme, themed “Greening Your School”, attracted the participation of more than 70 students from 12 schools. The winning solution was “Wonder Washaway” by Sekolah Sri Puteri



Green Minds Challenge Programme for Secondary School Students



2016 GMC – Winner Sekolah Sri Puteri



Magical Liquid

Puteri, Cyberjaya. It was developed to reduce water usage in toilets by filling up a used plastic mineral water bottle with pebbles and placing it in the cistern.

In 2018, MGTC partnered with Majlis Perbandaran Subang Jaya (MPSJ) to embed GMC into MPSJ’s Smart Gen Programme for schools under its jurisdiction. SMK Sri Serdang was selected as the champion with “Magical Liquid”, which reduces the volume of water needed in handwashing and cleaning of equipment. The liquid uses plants found in the school compound and is packaged in recycled liquid soap bottles.



Programme developed for secondary school students to **Inculcate, Educate And Create Green Leaders** who will then **Deliver Solutions To Environmental Issues**

## 2019 Highlights

In 2019, **MGTC partnered with Yayasan Hijau Malaysia (YaHijau)** to take more than **500 students** from **nine universities** to the 10<sup>th</sup> IGEM under the MGTC UnivTour programme. The guided tour offered first-hand experience to participating students in green technology innovations. It **enhanced the students’ understanding of the green technology landscape** in Malaysia.



## Entrepreneur Programme

Various programmes have been organised in collaboration with third parties over the last decade to promote entrepreneurship in green technology.



## Climate Launchpad



In 2018, MGTC partnered with the Malaysian Global Innovation and Creativity Centre (MaGIC) on Climate Launchpad (CLP), which accelerates the growth of green technology-based start-up companies. The objective is to shape innovative green business ideas into viable business solutions, attracting greater take-up by financial institutions and investors.

The focus was on facilitation and mentoring of participants as well as creating access to public-private funds with MGTC and MaGIC contributing RM100,000 each. The biggest attraction of the project was the chance for start-ups to qualify for the Grand Championships of the CLP 2018 in Scotland. Following a two-day Bootcamp facilitated by a CLP trainer and a six-week Acceleration Lab, the national final for CLP was held, and three champions were enrolled for Scotland.

Overall, the programme served to unlock the potential of Malaysia's green economy as it developed successful green entrepreneurs and created more green job opportunities.

## 2019 Highlights

In 2019, several programmes were organised at the three-day IGEN held at Kuala Lumpur Convention Centre to **promote aspiring green technology entrepreneurs**. It included the Sustainable Innovation Awards (SIA) and MDBC Innovation and Sustainability Awards (MISA).

### Sustainable Innovation Awards (SIA)

SIA served as a **platform to recognise excellence in research and product innovation in Green Technologies, Sustainable Innovations and Eco Innovations**. Young inventors were provided with a space to introduce their innovations, and connect with investors and business partners.

A total of **54 inquiries** and **28 online submissions** were received, of which **12 inventions** were showcased. The following four inventions won Gold awards:



## GOLD WINNERS

INVENTION / INNOVATION	INVENTOR / INNOVATOR
Low Carbon Transport Monitoring System	University Tun Hussein Onn Malaysia & Majlis Perbandaran Batu Pahat
Blockchain Energy Savings Consortium (BESC)	EPC Blockchain
Sistem Pemantauan Operasi Pam (SPOP)	Majlis Bandaraya Melaka Bersejarah
PathoSans: Cleaning & Disinfecting System For A Sustainable Tomorrow	Spraying Systems Malaysia

### MDBC Innovation and Sustainability Awards (MISA)



Winners of MISA 2019 With YB Hannah Yeoh

Through **MISA**, companies were **given a platform to showcase their best practices** and trailblazing spirit **in the areas of sustainability and innovation**. Shortlisted finalists presented their projects to a panel of judges and a general audience earlier the same day. Ensuring transparency, judges and the audience had the opportunity to ask questions of the finalists regarding their projects, something that also provided a learning experience for the attendees. Winners were then recognised at a ceremonial awards dinner held at the Grand Hyatt Kuala Lumpur.

### Winners of MISA 2019



Best Innovative Waste Management Programme:  
Better – Bev



Best Digital Green Tech:  
Satelligence



Best Practice for Renewable Energy:  
Concord Group



MISA '19 Audience Award:  
Besi APAC

## PROVIDING ACCESSIBILITY TO GREEN INNOVATION

MGTC seeks to make green innovations more accessible to the public, enabling Malaysians to experience developments that in the process, we demonstrate Malaysia's ability to become a powerhouse for green technology alongside developed nations.

One of the most outstanding models of green innovation in the country is MGTC's premises, the GEO building. Commissioned in 2007 and completed in 2010, the building marked a milestone in the adoption of sustainable building design and technology in Malaysia. To date, MGTC still receive streams of visitors to experience and learn about the various green building innovation including green building design concept, energy efficiency (EE) and renewable solar photovoltaic systems.

## Solar Photovoltaic Innovation

Solar photovoltaic systems form a key feature of the GEO building and have been aesthetically incorporated into its design. Building-integrated photovoltaics (BIPV) systems generate electricity for the building's needs while exporting surplus into the national grid during the daytime via a net-metering arrangement. The BIPV systems provide up to 50% of the building's electricity requirements, which amounts to 120,000 kWh/year.



**Building-integrated photovoltaic (BIPV)** are photovoltaic materials that are used to replace conventional building materials in parts of the building envelope such as the roof, skylights, or facades.



**1 System A:**  
Polycrystalline

**2 System B:**  
Amorphous Silicon



**3 System C:**  
Monocrystalline  
Glass-Glass

**4 System D: 27 kWp**  
Monocrystalline



**Showcases Solar  
Photovoltaic Systems**  
which are architecturally  
and aesthetically incorporated into the  
GEO building's design



**F Systems E and F:**  
Thin Film CdTe

## Green Building Innovation

The GEO building incorporates many innovative features. The floor slab cooling system was the first in Malaysia. It is an innovative cooling system, where 50% of the cooling comes from the ceiling and the floor by means of chilled radiation and the rest by air volume for each building zone. Two types of radiant cooling system are demonstrated in the building, namely Floor Slab cooling (wet type) and Chilled Metal Ceiling colling (dry type). Chilled water temperature at 18° Celcius was led into the designated floor slabs giving a surface temperature of 21° Celcius at the ceiling and 21.5 at the floor. Floor slabs are cooled early in the morning via embedded cooling pipes.

GEO building features various passive green building ideas. Among them are:



**Building Orientation**



**Roof light/Skylight**



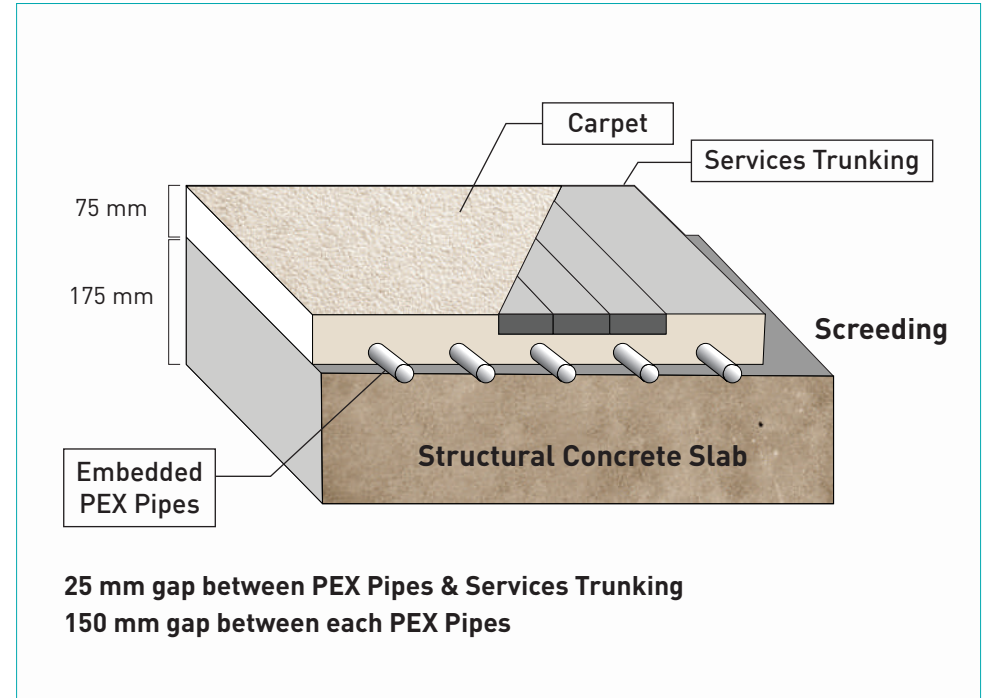
**Insulate interior from external heat using mineral wool, foam and aerated concrete block**



**Optimum orientation with windows and doors faced towards North and South**



**Self-shading design to prevent glare while maximising daylight usage**

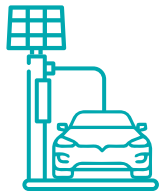


*PEX Pipes Before Covered With Structural Concrete*

## Electric Mobility

MGTC is also promoting the electric vehicle (EV) as part of emission reduction solution in transportation sector. It owns an EV fleet including Tesla Model S, Nissan Leaf, Renault Zoe and Mitsubishi IMIEV models, which is introduced to the public to drive home their value. Through outreach programmes, MGTC also hopes to allay any misconceptions the public may have on the effectiveness of EV and their usability.

MGTC initiated the Tesla programme in 2016 in order to provide access to Malaysian on the latest EV technology in the world. Tesla Model S was among EV that has battery capacity range of more than 400 km then. Coupled with its advanced digital technologies application, Tesla EV attracted attention and interest among Malaysian ranging from YAB Prime Minister, Ministers, Senior Government officials, CEOs, professional, inventors and public. Tesla approach to its overall business model was a game changer to global automotive industry which has attracted interest on how to deploy green technologies in an innovative way.



MGTC is promoting the **EV Agenda**



## What's Next >>



### Green Incubation Hub

More can be done to cultivate a research culture hence various strategies have been outlines to stimulate the country's green technology industry. These include a proposal to establish a Green Incubation Hub.

Among others, the Green Incubation Hub is to fund local research into the development of innovative products. It would also reduce the need to import green products by promoting a green economy across Malaysia's states and cities.

Under the first phase of this five-year initiative, five of Malaysia's leading research institutes and university partners are to deliver 26 strategic science programmes and 14 key national research projects. Ultimately, the programme seeks to promote R&D-based entrepreneurship and increase the portfolio of green products available for enhanced economic growth.