

# MOVING TO HIGHER VALUE-ADDED ACTIVITIES



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The Electric and Electronics (E&E) industry continues to be a key driver of Malaysia's industrial development and contributes significantly to GDP growth, export earnings, investment, and employment. In 2015, 93 E&E projects with investments worth RM8.9 billion were approved, exceeding our annual target of RM6.0 billion. Of this, 26 projects were new projects with investments of RM2.1 billion while 67 were expansion/diversification projects with investments amounting to RM6.8 billion. Foreign investments continued to dominate overall investment, accounting for RM8.2 billion (92 percent) of total investments as compared to RM0.7 billion (8 percent) of domestic investments. Overall, a total of 455 projects, valued at RM45 billion have been approved for the period of 2011 to 2014, where 78 percent or 356 projects valued at RM35 billion have been realised thus far.

Exports of E&E products rose by 8.5 percent to RM277.92 billion



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in 2015 versus RM256.14 billion in 2014, the highest export value since 2007 and accounted for 35.6 percent of total exports. This was driven by continued demand for new applications of internet of things (IoT) for wireless communications and wearable devices. Major E&E export destinations with significant increase (exceeding RM1 billion) for 2015 include Singapore, USA, Thailand, Republic of Korea, Germany, Japan and India.

Since inception, the NKEA E&E has achieved 78 percent of its Roadmap's target at end-2015, and is on track to meet its overall targets by 2020.

The signing of the Trans Pacific Partnership Agreement (TPPA) on 4th February 2016 is expected to benefit the E&E industry as a whole, as it will provide Malaysian companies, particularly SMEs, the opportunities to export their products to TPPA member countries, which collectively account for 40 percent of global GDP.

The E&E industry has remained as Malaysia's economic mainstay since the 1970s. The Ministry, together with its agencies such as MIMOS, SIRIM and NanoMalaysia Bhd have been playing an active role in re-energising this sector.

In 2015, MIMOS undertook the task to train more than 500 E&E engineers and students. As a result, more than 150 companies directly benefited from the programmes offered through its Advanced Shared Facilities.

The Nanotechnology Semiconductor Technology Centre (NSTC) at MIMOS, launched in July 2015, provides complete E&E ecosystem support in the areas of nanoelectronics, graphene and semiconductor microelectronics.

The Ministry is fully committed in supporting the adoption of nanotechnology in Malaysia, as it is a game-changing innovative technology with amazing potential to energise the growth of our industries through the creation of more high-value local products and solutions.

NanoMalaysia's commercialisation frameworks, namely iNanovation and National Graphene Action Plan 2020, leverage on and maximise utilisation of existing infrastructure and talent, further strengthening the public private partnerships.

During the year, we also launched the National Internet of Things (IoT) Strategic Roadmap. The main objective of this roadmap is to create a national ecosystem that enables the proliferation of use and the industrialisation of IoT as a new source of economic growth.

In 2015, Malaysia's total export for E&E products was RM277.92 billion. With new breakthrough discoveries in nanotechnology and the rise of IoT, we have the potential to increase our export by 2020.

**E**lectrical and electronics (E&E) is the leading and the most liberalised industry in Malaysia's manufacturing sector. Since the establishment of the first semiconductor plant in Penang in 1972, Malaysia has become a major global manufacturing hub for the E&E industry. Four decades on, Malaysia continues to be a preferred E&E investment destination.

E&E products have been the largest traded items for Malaysia for several decades since the industry inception in the 1960s. The industry evolution until today has turned Malaysia as one of the leading points in the global E&E value chain.

As Malaysia moves forward, the E&E segment is focused on deepening and strengthening the three major

ecosystems of semiconductors, solar and Light emitting diode (LED) technologies.

Semiconductors are expected to continue spearheading the growth of the E&E industry in Malaysia and will continue to benefit from growing global demand in the usage of mobile devices (smartphones, tablets), storage devices (cloud computing, data centres, personal data drives), optoelectronics (photonics, fibre optics, LEDs) and embedded technology (integrated circuits, PCBs, LEDs).

The growth trends achieved during the year reflect a concerted, industry-wide effort to shift from low value-added activities to high-value operations to remain competitive in a globalised economy.

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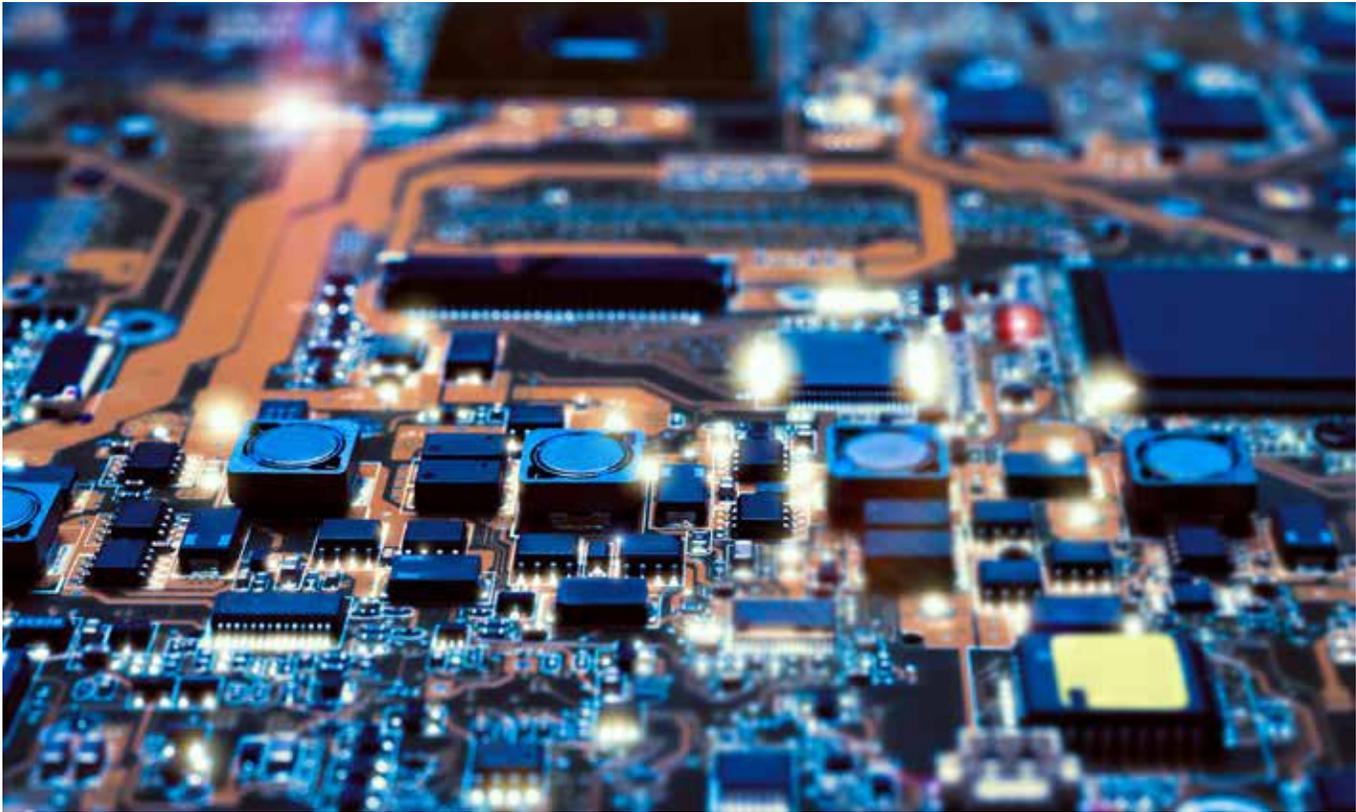
## Delving into Downstream Industries

Strong expansion in downstream industries boosted the E&E Gross National Income (GNI) to RM53 billion in 2015 versus RM46.5 billion in 2014.

In 2015, the Malaysia Investment Development Authority (MIDA) has already approved total E&E investments of RM8.9 billion, exceeding the full-year target of RM6.0 billion. The bulk of investment was from foreign investors. They include a RM2 billion investment by an

American company to manufacture multi-sensor and heat-assisted magnetic recording devices; a new project by a wholly Malaysian-owned company with investment of RM71 million to undertake the activities of die preparation at wafer level for photonics integrated circuits (IC); and two new solar cell and module manufacturing plants owned by Chinese firms worth RM600 million.





Of the cumulative RM45 billion worth of investments approved in 2011-2014, RM35.2 billion or 78 percent was realised. This exceeded the target of 65 percent.

In 2015, MIDA approved 11 high impact projects in the NKEA, under-

- EPP1: Semiconductor fabrication plant (1)
- EPP2: Advanced packaging (2)
- EPP3: Integrated circuit (IC) design firms (1)
- EPP4: Substrates manufacturer (2)
- EPP6: Wafer and cell producers (1)
- EPP7: Solar module manufacturers (1)
- EPP14: Transmission and distribution (T&D) equipment manufacturers (1)
- EPP17: Mobile devices companies (1)
- Business opportunity (BO) 5: Network storage solution technology hub (1).

On 25 June 2015, the Electrical and Electronics Strategic Council (EESC) was set up with the aim of providing strategies to raise the nation's E&E industry to the next level of capabilities and competitiveness. The EESC, chaired by the Minister of International Trade and Industry, will act as an advisory platform for the E&E industry over the next five years.

The timing of introducing the EESC could not be better as it will identify the gaps in the E&E ecosystem and establish sub-working groups to address specific needs for the industry to move forward in the next five years. Over the years, local companies have been impacted by the rising cost of doing business, such as the implementation of the goods and services tax (GST), impact of a weak ringgit on import costs, lack of local talent and stiff competition from lower-cost competitors in China. All these have further capped the growth of local E&E companies.

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## Turning on LEDs

Malaysia is now gaining prominence as a production hub for LED manufacturers. The development and production of LED clusters in the country cover semiconductor devices for LED, wafer fabrication, lighting products and solutions. LED applications include vehicle lighting, backlights and displays.

Osram Opto Semiconductors is investing €1 billion (RM4.67 billion)

to construct a new LED chip plant in Kulim, Kedah. Construction will likely kick off in the first quarter of 2016. The plant is set to be the largest and latest six-inch LED chip production site in the world. It is part of the group's €3 billion new investment that will transform it into a global semiconductor player.

This project will be beneficial to Malaysia in terms of jobs creation and further strengthens the value

chain of other local players in the LED industry. In addition, it will complete the LED ecosystem in Malaysia, and make the country more conducive for the deployment of high-technology projects.

Whilst the industry has had a good run in 2015, there are some new challenges especially for the local LED manufacturers. LED lamp testing is costly and takes a long time (6,000 hours) due to new standards (MS 62722-2-1) imposed by Europe and the US. This has delayed the penetration of newly certified LED products into international markets.



P-Plus Sdn. Bhd., a company under the Green LED/SSL Programme showcasing Malaysian made LED/SSL products at SME Corp Malaysia's closed door business linkages event

## Harnessing the Power of the Sun



First Solar launched its TetraSun technology-based production line at its PV manufacturing complex in Kulim Hi-Tech Park, Malaysia

As at December 2015, Malaysia is home to a total of 16 solar manufacturing plants, with a production capacity of 2.6GW of cells and 5GW of modules per year.

During the year, the Northern Corridor Economic Region (NCER) welcomed two new solar panel players, JA Solar Holdings Co Ltd and JinkoSolar Holdings, to Penang. JA Solar Holdings Co Ltd, one of the world's largest manufacturer of high performance solar power products, invested RM300 million in October 2015, to establish its first manufacturing facility outside China. This factory's output would represent 10 percent of the company's total production capacity globally.

Meanwhile, JinkoSolar's solar cell and module manufacturing facility commenced production of highly-efficient cells and multi-crystalline modules in May 2015, providing the company with an additional capacity of 500MW for solar PV cells and 500MW for modules annually.

While the growth of the solar panel industry is evident, it is not without its challenges. In May 2015, the European Union (EU) launched an investigation into Taiwanese and Malaysian solar panel manufacturers after Chinese exporters were accused of evading anti-dumping levies by shipping solar panels to the EU respectively through Taiwan and Malaysia.

Anti-circumvention duties of 53.4 percent and anti-subsidy duties of 11.5 percent now apply to Chinese solar PV panels and cells shipped from Taiwan and Malaysia to the EU. To mitigate the impact of this on the local industry, the Ministry of International Trade and Industry (MITI) is putting in place measures in the approval of Chinese companies setting up manufacturing facilities in Malaysia to ensure high value activities are conducted in Malaysia and local companies are part of the supply chain.

## Expanding the Electrical & Electronics Industry

High value Research and Development activities are crucial as the nation moves up the value chain within the E&E industry.

During the year, Penchem Technologies Sdn Bhd developed graphene conductive inks that have conductivity levels suitable for printed electronic applications. This is significant as printed electronics is crucial in many downstream applications such as wearable devices and flexible electronics, as well as key enablers of various Internet of Nano-Things (IoNT) solutions. To date, Penchem has signed agreements with various partners to use the developed graphene inks for application development, namely in radio-frequency identification (RFID), sensors and printed electronics.

The prototyping of an electric bus and lithium-ion (Li-ion) batteries for electric and hybrid vehicles – a collaboration between the Malaysia Automotive Institute (MAI), University of Wollongong and University Technology Sydney, AutoCRC Ltd and Swinburne University – were also completed during the year. The prototype e-bus was revealed at the ASEAN Auto Show 2015. Commercialisation and mass production are expected to start in the second half of 2016.

The Malaysian Green Technology Corp (GreenTech Malaysia), a government agency under the purview of the Energy, Green Technology and Water Ministry, is pushing for electric-powered mobility. They aim to install 300 charging stations nationwide by 2016 with more than 70 already installed in the Klang

Valley, Malacca, Pahang, Penang and Sarawak. Among the parties GreenTech Malaysia is working with is Eclimo Sdn Bhd, a Malaysian-owned electric vehicle company manufacturing electric motorcycles and lithium ion battery packs. Eclimo has supplied 450 electric scooters to the Women Peace Police Squad (Amanita), KFC, Penang council, Penang Island City Council, Penang Botanic Gardens and the state of Melaka.

In addition, Universiti Teknologi PETRONAS (UTP), in collaboration with local LED/ Solid State Lighting (SSL) designer Hans System Design Sdn Bhd, developed a copper-carbon nanotube (Cu-CNT) nanocomposite substrate for thermal management in LED applications that improves lighting performance. During the year, the company upscaled and commercialised the technology in LED lighting application. This technology has various other electronics applications that can be adapted and licensed to players in various industries.

## MIMOS'S SHARED SERVICES FACILITIES USEFUL FOR MARKET PLAYERS

MIMOS Nano-Semiconductor Technology (NST) provides analytical shared services and facilities, with the aim of becoming a major catalyst for the development of electrical and electronics (E&E) sectors in Malaysia and the region by offering a flexible engagement model, short turnaround time and integrated value-added services at competitive prices. Among the services offered are failure analysis/material analysis, reliability testing, wafer and integrated circuit (IC) testing, IC design, wafer prototyping, and hands-on industrial upskilling programme.

Software and testing tools are expensive. As such, MIMOS' facilities had become invaluable to companies that do not have their own facilities or tools. Fintex

Technologies Sdn Bhd, for example, relies on these shared services and facilities – they have become part of its processes, and a channel to market its products, provide demonstrations and introduce new technologies. The facilities also enable its engineers to acquire hands-on experience and develop new techniques. The facilities had indeed helped Fintex innovate and evolve to meet its customer demands.

Fintex is a trading company that provide sales as well as after-sales support including installation, training, application support, and commissioning. Over the years, it has also specialised in turnkey projects for Infineon China, Silterra, X-FAB, etc to set up failure analysis and reliability testing. The people behind Fintex have 20

years of experience in providing technical services to manufacturers in a wide range of industries, including consumer electronics and information technology equipment. Prior to the setting up of MIMOS' shared services and facilities, Fintex had sometimes used some of its customers' facilities but these came with many constraints. Using MIMOS' facilities had helped Fintex save time and costs by up to 30 to 40 percent, on average.

Having benefited from MIMOS' shared services and facilities, Fintex now actively markets them to its customers as well.