

# ELECTRICAL AND ELECTRONICS



The E&E industry continues to be a key driver of the Malaysian economy, with significant contribution to the country's manufacturing output, employment, investments and exports





**Dato' Sri Mustapa Mohamed**  
Minister of International  
Trade and Industry

## Q&A

### HOW WOULD YOU APPRAISE THE PROGRESS OF THE ELECTRICAL AND ELECTRONICS (E&E) NKEA SINCE THE LAUNCH OF THE ETP?

The E&E industry continues to be a key driver of the Malaysian economy, with significant contribution to the country's manufacturing output, employment, investments and exports. The presence of top manufacturing services created opportunities for local companies to form partnerships, thus allowing the local SMEs to develop full-scale design-to-manufacturing capabilities.

This does not mean there aren't important hurdles and challenges to be addressed. The emergence of new economic powerhouses brought on by liberalisation and globalisation has created a highly competitive market. In order for Malaysia to compete in this environment, the Government, through this NKEA, actively supports the transition of domestic players to large home-grown entities that are engaged in high-value activities. It is heartening to note that foreign investors continue to find Malaysia an ideal location for high value-added activities. Such investments are in line with the Government's efforts to transform Malaysia into a high-income nation.

### HOW DID THE E&E INDUSTRY FARE DURING THE YEAR?

Strong expansion in downstream industries by existing players during the year allowed the sector to stay the course to achieve its GNI target for 2020. The value of E&E's GNI stood at RM44.1 billion in 2014 as compared to RM38.7 billion in 2013. This trend is reflective of a concerted, industry-wide effort in the shift from low value-added activities to high-value operations to remain competitive in a globalised economy. The increased high-value activities and investment inflows saw the E&E sector account for a significant portion of the country's national GNI growth of 14 per cent last year.

The sector also achieved another milestone during the year, with Malaysia emerging as a test and measurement hub in this region following the setup of new test and measurement facilities by leading MNCs. This is set to boost a number of supporting industries such as logistics, contract manufacturing and industrial design.

### MOVING FORWARD, WHAT OPPORTUNITIES DO YOU SEE FOR THE E&E SECTOR?

For the E&E sector, keeping pace with fast evolving technologies is crucial to the industry's overall competitiveness vis-à-vis other regional markets. Increasingly, global demand for E&E through its Internet of Things and nanotechnology morphs the industry into the game-changer foreseen, catalysing growth in other sectors. Massive opportunities loom for other sectors to adopt cutting-edge technologies as a result of E&E technological enhancement inherently increasing productivity. These global trends are set to create new growth opportunities in the upstream and downstream segments of the industry. This must be the way forward for Malaysian players to remain competitive globally.





**Datuk Dr Ewon Ebin**

Minister of Science,  
Technology and Innovation

#### **WHAT IS THE PROGRESS OF THE ELECTRICAL & ELECTRONICS (E&E) NKEA SINCE THE LAUNCH OF THE ETP?**

The E&E NKEA has entered the second phase of implementation with increased vitality, with gross exports of manufactured electronics indicating Malaysia's increasingly stronger position in the regional and global markets. Currently, the export value of the E&E and semiconductor industry is in excess of RM250 billion. In 2014, the GNI of the E&E sector amounted to RM44.1 billion. This development reflects the ETP's positive results as it reaches its maturity.

MOSTI's lead agency in E&E, MIMOS Bhd, has continued to energise the ecosystem with its technological expertise, while the establishment of its Advanced Shared Facilities as well as those set up by SIRIM Bhd and National Instruments have been a game-changer in facilitating higher value-add activities by E&E SMEs. Not only do these facilities serve the industry's needs in areas such as research and development and commercialisation, but also work to upskill the current E&E workforce and help to create new talent through skills-based learning for university students and new graduates

#### **WHAT HAVE BEEN THE MAJOR LESSONS LEARNT IN THE IMPLEMENTATION OF THE E&E NKEA?**

Good synergy between agencies under MOSTI, MITI, EPU and PEMANDU in working towards delivering and achieving project results has helped speed up documentation processes after project approval from the Steering Committee. I would also attribute our success to the efforts by the NKEA team, who followed up closely and managed each project milestone to ensure all activities were on track. In the case of projects undertaken by MIMOS, we received strong support from MITI and PEMANDU during EPU presentation and justifications.

We have also improved the operating model for the Advanced Shared Facilities in response to the needs of SMEs, while we have seen unexpected interest from institutes of higher learning to use the facilities for the students, lecturers and researchers, who may become the future talent pool for the E&E industry. Finally, we are also cognisant of the need to continuously identify and implement enabler programmes based on the ever-changing global situations. At the same time, we must be bold enough to predict the needs of future enabler programmes to support long-term economic developments.

#### **WHAT AREAS OF THE E&E NKEA WILL MOSTI FOCUS ON GOING FORWARD AS THE ETP ENTERS ITS LAST MILE TOWARDS 2020?**

MOSTI will continue to drive the efforts to transform the E&E sector. The establishment of Advanced Shared Facilities will continue to provide a cost-effective and comprehensive resource to the industry and academia, adding and innovating value to the industry hence creating a vibrant and resilient E&E ecosystem in the country. Through its various enabler and catalyst programmes, MOSTI with its agencies will continue to play vital roles in the advancement of E&E industries in Malaysia and to support the attainment of the GNI target of RM90 billion by the year 2020.

# ELECTRICAL AND ELECTRONICS

Malaysia remains one of the key Electrical and Electronics (E&E) manufacturing countries in ASEAN, where production is led by multinational corporations (MNCs). Foreign investors continue to find Malaysia an ideal location for high value-added activities due to its strong and diversified base across multiple industries.

Malaysia's continued competitiveness in E&E saw it record strong and sustained inflows of foreign investments in 2014. This continued investment from foreign companies even amid global economic uncertainties is noteworthy and encouraging.

In 2014, Malaysia made its way into the top 20 out of 144 countries on the World Economic Forum's Global Competitive Index (GCI) for the first time since the

current methodology was introduced in 2006. Overall, Malaysia is ahead of China, Korea Republic and developing Asian economies, but behind Singapore and Taiwan. The report also ranked Malaysia fourth in financial market development, making it relatively easy for E&E companies to access capital. Malaysia is also ranked 10th in incentives for investment and 10th in the number of procedures and formalities to start a business for E&E companies.

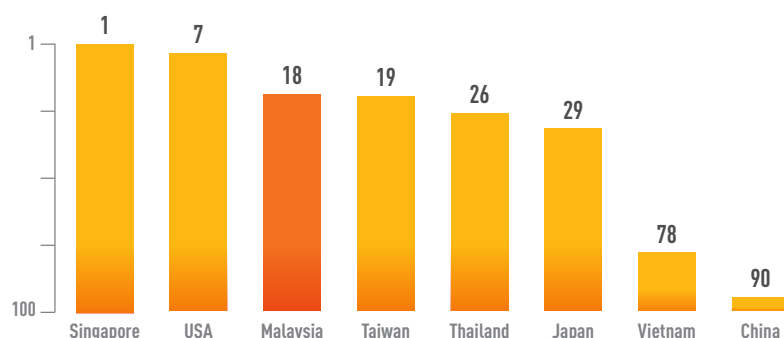
No.	Competitiveness Factors Driving E&E Industry	World Ranking				
		Singapore	Taiwan	Malaysia	Korea Republic	China
1	Infrastructure	2 <sup>nd</sup>	11 <sup>th</sup>	25 <sup>th</sup>	14 <sup>th</sup>	46 <sup>th</sup>
2	Labour market efficiency	2 <sup>nd</sup>	32 <sup>nd</sup>	19 <sup>th</sup>	86 <sup>th</sup>	37 <sup>th</sup>
3	Incentives to invest	4 <sup>th</sup>	33 <sup>rd</sup>	10 <sup>th</sup>	106 <sup>th</sup>	44 <sup>th</sup>
4	Low tax rates	27 <sup>th</sup>	58 <sup>th</sup>	65 <sup>th</sup>	30 <sup>th</sup>	13 <sup>th</sup>
5	No. of procedures to start business	10 <sup>th</sup>	10 <sup>th</sup>	10 <sup>th</sup>	32 <sup>nd</sup>	13 <sup>th</sup>
6	Financial market development	2 <sup>nd</sup>	18 <sup>th</sup>	4 <sup>th</sup>	80 <sup>th</sup>	54 <sup>th</sup>
	Overall	2 <sup>nd</sup>	14 <sup>th</sup>	20 <sup>th</sup>	26 <sup>th</sup>	28 <sup>th</sup>

Source: The Global Competitiveness Report 2014-2015, World Economic Forum

Furthermore, the World Bank's Ease of Doing Business Index 2014 ranked Malaysia 18th, with the country's

regulatory environment more conducive to E&E business operations than in China and Taiwan.

**Country Ranking Based on Ease of Doing Business, 2014**



Source: Doing Business 2015, 12<sup>th</sup> Edition, World Bank Group

Exhibit 7.1

The country however faces competition from regional neighbours Singapore and Thailand, which along with Malaysia have been competitive investment destinations for over 30 years. Inbound investment is particularly important to regional competitiveness in this industry as a limited number of large MNC firms account for most of the production of many types of components.

Industry trends show that MNCs continue to expand their operations horizontally as well as extend the

vertical integration of their operations by incorporating higher-end activities, particularly in advanced research, design and development. This creates opportunities for Malaysian talent in the development of new products and leading edge technologies such as the design and manufacturing of advanced semiconductor devices. Besides the positive economic benefits to Malaysia in the form of high-income employment opportunities, this push into high-end activities also increases usage of local infrastructure, financial services,

information technology and utilities and logistics services.

To further drive the growth of the Malaysian E&E industry, especially to encourage private sector participation and the development of smaller players, EPPs 1-4 of the E&E NKEA have been placed under a semiconductor cluster, with MIDA and MIMOS Bhd working together to develop a programme focused on further developing the semiconductor industry, ensuring end-to-end solutions are available in Malaysia.

Continued growth of the E&E industry in Malaysia will hinge on greater participation from the private sector in driving upstream activities. This will be crucial in increasing the value-add of the Malaysian industry in tandem with the country's transformation into a high-income economy.

Other key initiatives required are MNC-local vendor development partnerships as well as encouraging the growth of IC design firms.

## 2015 Outlook

The industry is expected to continue growing in 2015 driven by activities in smart manufacturing and continued investments in the E&E NKEA's EPPs. Furthermore, investors are expected to realign their products and services in tandem with global trends.

These trends include the emergence of IoT (Internet of Things) and nanotechnology, which will create new opportunities for growth for the industry in the upstream segment in areas such as research and development, as well as in the downstream segment in the areas of marketing, distribution and sales. Malaysian industry players must therefore keep abreast of the latest technology to continue being competitive in the global market.

In terms of nanotechnology, Nano Malaysia Bhd, the lead agency for EPP 20, will continue facilitating nanotechnology projects by helping private companies come up with prototypes for proof of concept. This is in anticipation of moving into the next phase of nanotechnology development in Malaysia, which is focused on commercialising the technology and encouraging mass production.

Under this NKEA, efforts in IoT are undertaken through EPPs 12, 13 and 17. This year is expected to see EPP companies furthering their activities in IoT, such as by making devices more connected with each other in line with the objective of this technology.

However, the solar panel industry may be challenged due to the possibility of the US conducting a circumvention investigation on Malaysian solar products if it determines that components of these solar products originate from China and Taiwan. This follows the US Department of Commerce's final determination on anti-dumping duties imposed on China and Taiwan in December 2014. This could adversely impact growth of the Malaysian solar panel industry if similar duties are imposed.



## 2014 KPI Analysis

This year saw strong expansion in downstream industries helping keep the E&E industry on track to achieve its GNI target for 2020. The value of E&E's GNI stood at RM44.1 billion in 2014 as compared to RM38.7 billion in 2013, and has expanded at a rapid pace of 14 per cent.

This is an encouraging performance as the GNI of the 12 NKEAs as a whole expanded at 7.8 per cent while the country's GNI expanded at 8.4 per cent. Also encouraging was the growth in high-value E&E jobs which came in at 17 per cent during the period from January-July 2014 as compared with the same period in 2013. The growth in high value E&E jobs from 2012 to 2013 meanwhile was 19 per cent.

The total approved investments of RM8.9 billion this year have already far exceeded the target of RM5.1 billion,

while the RM38.26 billion in cumulative investments approved from 2012-2014 are expected to start yielding results beginning 2015. New facilities recently made available such as industrial design, test and measurement, and semiconductor testing will also lower barriers to entry and support new investments.

18 new high-impact projects were identified for implementation during the year, of which 11 were approved.

The enforcement of MEPS (Minimum Energy Performance Standards) in June 2014 is expected to boost demand for LEDs as it encourages the gradual phasing out of the production and import of incandescent lights and sub-par LEDs in the country. This is expected to spur further growth in the E&E industry.

Against this backdrop, this NKEA exceeded its KPI targets by 104 per cent. The 2020 target for EPP 11 to establish

Malaysia as a test and measurement hub was also achieved this year, six years ahead of its targeted completion date. This was largely due to the wide availability of a range of new industry-enabling test and measurement facilities.

Support from Government-linked agencies was also crucial in achieving this NKEA's KPI targets for the year. This includes the Malaysian Automotive Institute (MAI), Multimedia Development Corp (MDeC), NanoMalaysia Bhd (NMB), the Land Public Transport Commission (SPAD) and Malaysian Green Tech Corp (MGTC). Their downstream activities helped to stimulate demand upstream. The Malaysian Investment Development Authority (MIDA) also contributed by attracting high value R&D investments which catalysed growth.

### Year-on-year GNI Growth

RM billion

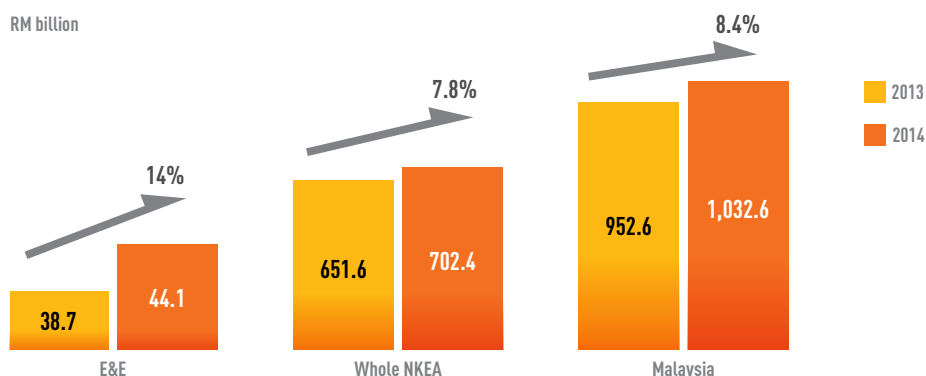


Exhibit 7.2

## 2014 Key Performance Indicators

ELECTRICAL AND ELECTRONICS NKEA		KPI (Quantitative)							
No.	KPI	Target (FY)	Actual (YTD)	Achievement					
				Method 1		Method 2		Method 3	
				%		%			
EPP #1	Number of E&E companies using Wafer Testing Lab	5	9	180	●	100	●	1.0	●
	Utilisation of Wafer Testing Lab	60	66	110	●	100	●	1.0	●
	Set up of Failure Analysis Level 3 lab	100%	100%	100	●	100	●	1.0	●
	Completion of Waste Treatment Plant	100%	90%	90	●	90	●	0.5	●
EPP #3	Completion of engineering samples for Green Motion Controller	100%	100%	100	●	100	●	1.0	●
EPP #10	Solid state lighting (SSL) companies penetrating global market:	100%	118%	118	●	100	●	1.0	●
	(i) Total annual sales from Green/SSL Programme of local LED companies (RM mil)	(i) 80	(i) 84.2						
	(ii) Number of new LED products by the Green/SSL Programme to be internationally certified	(ii) 20	(ii) 26						
EPP #11	Enhancing T&M local ecosystem: New product introduction	20	20	100	●	100	●	1.0	●
	Implementation of Agilent Life Science programme with one local design partner	100%	100%	100	●	100	●	1.0	●
EPP #13	Number of new automation projects by SMEs in system design, prototyping, proof-of-concept and system customisation at NI-AIN	25	20	80	●	80	●	0.5	●
	Completion of AMD project with appointment of three local M&E automation companies	100%	99%	99	●	99	●	0.5	●
EPP #17	Number of new embedded systems projects approved under Digital Malaysia roadmap	4	4	100	●	100	●	1.0	●
	Number of new embedded systems technology partners identified and accepted under Digital Malaysia Roadmap	2	2	100	●	100	●	1.0	●
EPP #18	Number of companies approved to manufacture batteries for electric vehicle	100%	150%	150	●	100	●	1.0	●
	(i) Percentage of construction for Li-ion battery factory (MAI)	(i) 50%	(i) 100%						
	(ii) Licence approval for EV bus manufacturer (MAI)	(ii) 1	(ii) 1						

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ELECTRICAL AND ELECTRONICS NKEA		KPI (Quantitative)							
No.	KPI	Target (FY)	Actual (YTD)	Achievement					
				Method 1		Method 2		Method 3	
				%		%			
EPP #20	Development and roll out of thermal management technology for LED application	100%	75%	75	●	75	●	0.5	●
EPP #1 – 20	Utilisation of Eco-Industrial Design Centre (EIDC): Rapid prototyping services provided	100	121	121	●	100	●	1.0	●
	Producing Eco-Industrial products: (i) Eco-industrial design projects utilising EIDC (ii) Joint programmes with universities	100% (i) 3 (ii) 2	100% (i) 3 (ii) 2	100	●	100	●	1.0	●
	Realisation of approved investments since 2011	60%	60%	100	●	100	●	1.0	●
	Total approved investment for E&E (RM bil)	5.1	8.9	175	●	100	●	1.0	●
	Approved high quality NKEA E&E projects	18	11	61	●	61	●	0.5	●
	QAV Penang utilisation: Quadrupling the number of models to be tested as per international standards	48	48	100	●	100	●	1.0	●
	Set up and test lab accreditation of QAV LED & Automotive Testing Facility in Subang, Selangor	100%	33%	33	●	33	●	0	●
				104%		92%		83%	

Exhibit 7.3

**Method 1** Scoring is calculated by a simple comparison against set 2014 targets. The overall NKEA composite scoring is the average of all scores

**Method 2** Scoring is calculated by dividing actual results against set 2014 targets with an added rule:

- If the scoring is less than 100%, score #2 is taken as the actual percentage
- If the scoring is equal or more than 100%, score #2 is taken as 100%. The overall NKEA composite scoring is the average of all scores

**Method 3** Scoring is calculated by dividing actual results against set 2014 targets with an added rule:

- If the scoring is equal and less than 50%, score #3 is indicated as 0
- If the scoring is more than 50% and less than 100%, score #3 is indicated as 0.5
- If the scoring is equal or more than 100%, score #3 is indicated as 1



## ENTRY POINT PROJECTS

EPP  
1

### EXECUTING A SMART FOLLOWER STRATEGY FOR MATURE TECHNOLOGY FABRICATION

The utilisation of wafer testing labs hit 66 per cent in 2014, exceeding the targeted industry average of 60 per cent. MIMOS also opened a new Level 3 Failure Analysis (FA) Lab in 2014 to enable material level analysis which means a full range of FA services are now available.

Five out of six projects assigned to MIMOS are now complete - the Wafer Fab-2 Power Quality Upgrade and the set-up of four advanced labs within MIMOS. The facilities at MIMOS are aimed at serving as enablers to the semiconductor industry. In 2014, nine companies utilised the wafer testing facilities in MIMOS.

The Northern Corridor Implementation Authority (NCIA) is also facilitating the construction of a waste treatment processing facility in Kulim Hi Tech Park which is now 90 per cent complete with an expected completion date of 2Q 2015.

After years of talks of divestments to foreign parties, the new direction for SilTerra is now to operate as a majority Malaysian owned enterprise. This allows the management to embark on strategic long term partnerships with industry players to strengthen SilTerra's hold in the More than Moore space in wafer fabrication.

#### KEY TAKEAWAYS

These labs provide a cost-effective and comprehensive shared facility to the industry and academia and have been used for advancing skills and knowledge of the E&E community through MIMOS' hands-on skill development programmes for university students and new graduates.

Since 2012, MIMOS has trained 186 engineers and graduating engineers, and 145 companies have benefitted from these facilities.

EPP  
2

### DEVELOPING ASSEMBLY AND TESTING USING ADVANCED PACKAGING TECHNOLOGY

This year saw one new significant investment for advanced packaging following SanDisk Corporation's decision to set up a manufacturing and R&D facility in Malaysia. The new SanDisk operation will consolidate Malaysia's standing as one of the world's leading centres for high-tech semiconductor manufacturing.

Another company, Carsem Malaysia Sdn Bhd, also expanded its facilities in 2014. SanDisk's project and Carsem Malaysia's expansion under this EPP

in 2014 counted towards the target of 18 new high-quality E&E projects for 2014.

#### SANDISK CORPORATION

SanDisk Corporation, a leading California-based flash memory storage manufacturer and Fortune 500 company, aims to strengthen its position in Asia by setting up a new plant in Batu Kawan, Penang. The new plant, which is targeted to commence operations in 1Q 2015, will produce flash memory solutions using imported

wafers from Japan. The NAND memory integrated circuit system-in-package (SiP) are one of the main drivers for the development of process technology for semiconductor production. SanDisk will also establish an R&D centre for the development of advanced packaging and testing of NAND Flash memory ICs and solid-state drives (SSD).

#### CARSEM MALAYSIA

Carsem Malaysia is a Malaysian company and a leading provider of turnkey packaging and test services

to the semiconductor industry. Carsem is ranked 10th in the world for outsourced semiconductor assembly and testing (OSAT) and has three high-tech factories.

In tandem with the changing role of OSATs, Carsem has moved up the value chain from manufacturing to providing solutions, recently introducing an ultra-small X3 MLP (Micro LeadFrame Package), which is the smallest MLP

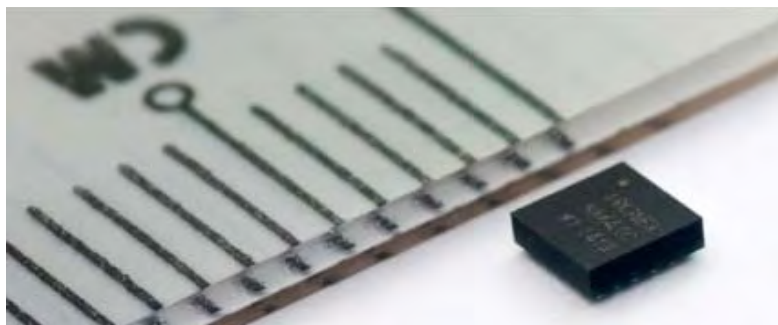
production package. Its expansion into this area follows the upgrading of its technology and R&D activities in advanced semiconductor packaging and testing. The company's SiP solution incorporates multiple die or passive components assembled in a leadframe-based format, while its advanced process solutions include flip-chip on leadframe (FCOL), chip on lead (COL) and copper clip/strap technologies.

### KEY TAKEAWAYS

MIDA has played an important role in driving investments in this sector through its various initiatives. Additionally, more companies have shown interest in participating in this EPP as Malaysia has established a developed semiconductor ecosystem, contributed in part by the ETP's efforts to drive the NKEAs' journey higher up the value chain.

EPP  
3

## DEVELOPING INTEGRATED CIRCUIT (IC) DESIGN FIRMS



Efinix's ultra low power programmable logic device in a very small form factor package consumes half the power at the same logic density as its closest competitor

Engineering samples of the Green Motion Controller (GMC) chip completed by MIMOS are now available for companies to adopt commercially. The GMC will enable more energy efficient applications such as hybrid electric vehicles and home appliances. MIMOS is also working on designing a GMC demo.

One new Integrated Circuit (IC) design company, Efinix Technology (M) Sdn Bhd (ETSB), started operation in 2014. ETSB is a fully-owned subsidiary of Efinix Inc, a programmable logic company offering a variety of Field-

Programmable Gate Array (FPGA) solutions to semiconductor companies and Original Equipment Manufacturers (OEMs) using Efinix Inc's core technology, EFabric.

EFabric is a newly patented disruptive Field Programmable Gate Array (FPGA) architecture that optimises circuitry. It is a technology improvement for FPGA in terms of power, performance, gate density, metal stack and time closure. This technology will be packaged into advanced packaging ICs such as 3D TSV IC and 2.5D TSV IC packaging, a first in Malaysia.

An emerging trend among fabless and fablite semiconductor companies is the establishment of R&D facilities alongside their manufacturing operations to enable them to leverage on onsite IC design capabilities. The presence of such IC design firms strengthens the semiconductor ecosystem and allows the industry to capitalise on Malaysia's burgeoning LED markets. Nonetheless, more IC design firms and fabless companies are needed to create a wider set-up of new technology and products.

The increasing investments of fabless companies in Singapore provide opportunities for Malaysian-based foundries and OSAT companies to commence and expand projects in Malaysia, with the rapid growth of the global semiconductor industry presenting many opportunities for Malaysian MNCs and SMEs. As Singapore and Malaysia face increasing competition from China and Taiwan, the two countries should leverage their existing ecosystem and find ways to compete by filling in gaps in the ecosystem and supply chain.



The Efinix team

### KEY TAKEAWAYS

There exist opportunities for Singapore and Malaysia to collaborate to grow a strong semiconductor ecosystem. Potential areas to focus on include addressing existing gaps in the semiconductor ecosystem such as wafer bumping, IC and testing and packaging services. Malaysia will also look to facilitate and explore possible collaborations with Singapore universities on skills training for the E&E industry.

EPP  
4

## SUPPORTING THE GROWTH OF SUBSTRATE MANUFACTURERS AND RELATED INDUSTRIES

Two new high-quality projects to support growth in the substrate manufacturing sector were seen in 2014: QDos Interconnect's move into Molded Interconnect Substrate (MIS) technology and I Biden Electronics' effort to manufacture high-technology Printed Wiring Boards for the telecommunications industry. These two projects were counted towards the target of 18 new high-quality E&E projects for 2014.

### QDOS INTERCONNECT

QDos is the pioneer manufacturer of Flexible Printed Circuits (FPC) in Malaysia and specialises in FPC design, prototype fabrication, mass production and Surface Mount Technology (SMT) solutions. With a strong background in FPC, QDos ventured into a new technology, Molded Interconnect Substrate through QDos Interconnect Sdn Bhd.

The MIS technology is licensed and patented by Advanpack Solutions Pte Ltd (APS), a Singapore-based R&D

company. With technology transfer from APS and synergistic integration with FPC technology, QDos will be consolidating its position as a leading semiconductor substrate manufacturer.

MIS is a new technology with potential to replace Lead Frame and Ball Grid Array (BGA) substrates. The use of build-up technology and a breakthrough from the conventional polymer core enables MIS technology to produce super-fine circuitry and enable high-performance applications, particularly those with 4G, low noise and high frequency requirements.

### IBIDEN ELECTRONICS MALAYSIA

I Biden Electronics Malaysia Sdn Bhd, a leading Japanese electronics and ceramics producer, expanded its existing facility in Malaysia in 2014 to include a second building at Penang Science Park. The High Volume Manufacturing for the new facility is focused on high-performance and advanced technology printed wiring boards (PWB) and free via stacked up structure (FVSS) to meet

worldwide demand for smartphones and other electronics products due to the increasing rollouts of 4G networks. This new technology will bring in multilayer next generation models.

The product will be exported worldwide and the investment will create new employment opportunities as well as opportunities for career advancement.

### KEY TAKEAWAYS

The ETP Roadmap identified the need to develop an additional four substrate manufacturers through this EPP. Following this, it is crucial to monitor the progress of companies which have been approved by MIDA to ensure they are able to deliver on their targets and ensure the industry continues to thrive. As these companies supply their products to other companies in the ecosystem, it is also vital that substrate manufacturers undertake continuous R&D to develop new applications which can benefit the rest of the industry.

EPP  
5

## INCREASING THE NUMBER OF SILICON PRODUCERS

Tokuyama Corp's RM3.72 billion polycrystalline silicon plant in Samalaju Industrial Park, Bintulu was commissioned in 2014 and operational in January 2015. The plant is the company's second in Malaysia, with the total annual production capacity for both its plants totalling 20,000 tonnes.

Other companies that were developed through this EPP include Elpion Silicon Sdn Bhd and Cosmos Petroleum & Mining Sdn Bhd, which are developing metallurgical silicon manufacturing in Banting and polysilicon manufacturing

in Bintulu, respectively. Elpion's maximum capacity is 100,000 metric tonnes whilst Cosmos' capacity is 12,000 metric tonnes to be progressively installed by 2020.

Samalaju, as a new industrial park, is however facing infrastructure constraints such as inadequate residential development. To resolve this, SCORE (Sarawak Corridor of Renewable Energy) will look into residential development within the Samalaju Industrial Park.

Higher electricity tariffs in Peninsular Malaysia are also posing a challenge to some players as this has led to higher production costs. Discussions are ongoing between MIDA and Tenaga Nasional Bhd to resolve the issue.

### KEY TAKEAWAYS

To achieve the 2020 target of 170,000 tonnes in annual silicon production, MIDA will continue to promote silicon producers and provide incentive packages which include tax incentives to make Malaysia more attractive to pioneer silicon producers.

EPP  
6

## GROWING WAFER AND CELL PRODUCERS

Malaysia is one of the largest photovoltaic (PV) producers in the world with a combined production capacity of 4,800

MW (megawatt) for wafers and cells in 2014, double the country's capacity in 2013.

The six wafer and cell manufacturers in the country - AUO Crystal, SunEdison, Panasonic, AUO SunPower, Hanwha

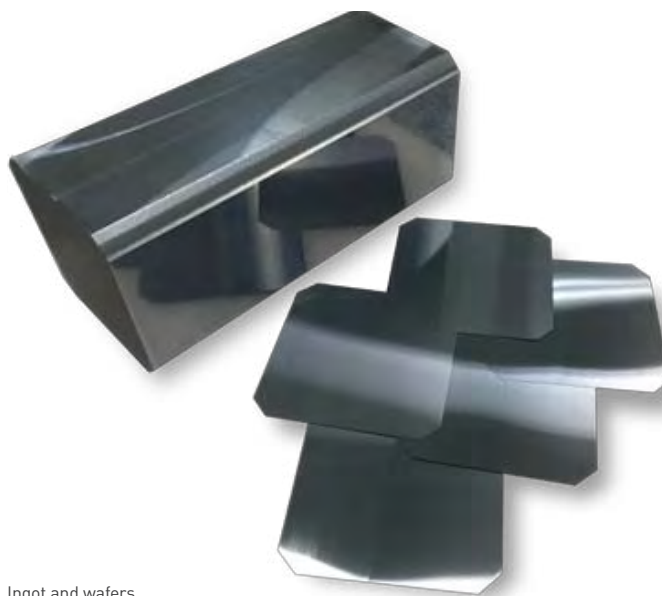


Crystal pullers in the Comtec Solar facility

QCells and TS Solartech – have been joined by a seventh, Comtec Solar International (M) Sdn Bhd. A new wafer cell company with a 1,000 MW capacity, Comtec Solar commenced its trial production of about 10 MW in Kuching, Sarawak in 2014.

### KEY TAKEAWAYS

To achieve the 2020 target of becoming the second-largest producer of solar cells globally with a 23 GW (gigawatt) capacity, MIDA will focus on attracting more high-quality local and international solar companies for wafer and cell manufacturing. Existing players are also expected to expand their capacity in 2015, subject to MIDA approval.



Ingot and wafers

EPP  
7

## INCREASING SOLAR MODULE PRODUCERS

Malaysia's solar module production capacity reached 2,540 MW in 2014, a significant 41 per cent jump from last year. A majority of the total production capacity of solar modules in 2014 was derived from foreign direct investment. Currently, seven solar module manufacturers are in operation in Malaysia - First Solar, Flextronics, MSR, SolarTif, PV HiTech, Panasonic Energy and EXT.

There is however, a possibility of the US conducting a circumvention investigation on Malaysian solar products if it determines that components of these solar products originate from China and Taiwan. This follows anti-dumping duties imposed on China and Taiwan in December 2014.

Circumvention activities take various forms and exploit different aspects of the anti-dumping and countervailing system. Circumvention activities include:

- assembly of parts in Malaysia;
- assembly of parts in a third country;
- export of goods through one or more third countries;
- arrangements between exporters; and
- avoidance of the intended effect of duties.

Under the possible circumvention investigation, Malaysian producers

will be requested to prove that they are genuine producers and not involved in any circumvention. MITI and MIDA are looking into how to mitigate this issue from the industry and manufacturing policy perspective.

### KEY TAKEAWAYS

To achieve the target of producing 12.9 GW by 2020, MIDA is targeting to bring in more high-quality solar module makers. Existing players will also undertake expansion in 2015, subject to MIDA approval. To further grow the solar value chain, however, Malaysia must explore the creation of a local accreditation and certification body for solar products.



EPP  
8

## DEVELOPING LED FRONT-END OPERATIONS

Philips Lumileds Lighting Company Sdn Bhd in Penang is undertaking an expansion project involving R&D activity for front-end process flow of epitaxial testing for LED wafer/die, and thin film flip chip tests. This will involve technology transfer from the Philips Lumileds group in Singapore and the US.

The new R&D activities will create opportunities for Malaysians to undertake challenging and complex activities, while complementing the LED ecosystem in Malaysia for LED front-end manufacturing.

### KEY TAKEAWAYS

MIDA will continue to strengthen this segment by engaging companies in developing front-end operations. The agency aims to bring in high-quality projects in LED front-end operations such as material substrate suppliers or epitaxy manufacturing. MIDA also expects an expansion project from the pool of existing players in 2015.

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## EXPANDING LED PACKAGING AND EQUIPMENT

Philips Lumileds is also undertaking an expansion and technology upgrading project of its LED chips and devices and LED-based lighting processes

using fabricated white dies. It will also conduct new R&D activities including epitaxy and thin film flip chip testing and prototype build process flow.

### KEY TAKEAWAYS

This expansion will further develop local capabilities and enhance the availability of local key core components.

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## CREATING LOCAL SOLID STATE LIGHTING CHAMPIONS

SME Corp's capacity building programme, which helps the 10 companies in the Malaysian LED Consortium (MLC) in the six areas of certification and regulation support, developing a technology roadmap, supply chain management, marketing strategy implementation, branding and partner search, moved into the second phase in 2014, supporting the MLC in achieving sales of RM84.2 million in 2014.

The year also saw 26 new LED products from MLC members penetrating international markets including Africa, the Middle East and the US, underscoring the success of targeted marketing missions led by SME Corp. LED companies also benefited from SME Corp's Business Development Programmes and Grant Facilitation Programmes for equipment and certification.

Despite breakthroughs into new markets and achievements in product certification, Malaysian companies still face challenges in terms of foreign market penetration, especially into Europe, and also face a long waiting period for certification. On average, it still takes about nine months per certification.



During the year, one new high impact project was approved which counted towards the target of 18 new high-quality E&E projects for 2014. The project comprises Penang-based NationGate Solution (M) Sdn Bhd's investment to upgrade its three production facilities in the Prai Industrial Estate, Penang this year. The home-grown contract manufacturer has diversified into the production of LED products and expects the sales of its own brand of LED tubes to double, driven by the production of 1,800 lumens and 2,600 lumens LED tubes. The new LED tubes are equipped with special digital drivers, designed in-house, which have a lifespan of 50,000 hours, compared to existing LED tubes which have analogue drivers with a lifespan of just 8,000 hours. The drivers function to channel current to power the LED modules. The LED tubes are

used mostly in commercial, industrial, corridor and outdoor lighting.

Currently, half of Nationgate's LED products are exported to Singapore, Thailand and Vietnam, with the remainder marketed locally. With the expected increase in production following the company's investment this year, Nationgate is targeting to expand its exports to new markets including Australia and New Zealand.

Besides the LED products, the company also makes transceivers for US-based IT companies, digital multimedia systems for passenger cars for a European automotive company, electronic components for a US telecommunication company and instrumentation and medical devices including water meters and blood

sugar analysers for its customers in Europe and Japan.

Nationgate, which has a staff strength of 2,000, has to date invested some RM100 million in its three production plants in Penang.

### KEY TAKEAWAYS

Malaysian companies must continue to go beyond the Malaysian market in order to grow the SSL industry. This requires targeted marketing missions that can create new opportunities for Malaysian companies. To this end, SME Corp will embark on the internationalisation phase of the Business Development and Capacity Building Programme for SSL companies, as well as continue grant facilitation for equipment and certification.

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## BUILDING A TEST AND MEASUREMENT HUB



FDM 400MC: Components produced are for form & fit, product illustration and master pattern



SLS P110: The machine is capable of producing functional prototypes. Suitable for tough and high temperature resistant components

Two companies - CEEDTec and Myreka - now have full scale design-to-manufacturing capabilities for equipment to support testing and measurement. They have also collectively created 33 pieces of intellectual property (IPs) - 18 by CEEDTec and 15 by Myreka. The two firms also released more than 20 new products, including in foreign markets, through the Keysight brand, a spinoff from Agilent Technologies.

CEEDTec has greatly expanded operations with a threefold jump in its high-value headcount from 79 to 229 employees. It has also tripled its revenue since 2012 and by the end of

2014, is expected to reach RM50 million in revenue that is projected to grow to RM350 million by 2024.

Myreka has more than doubled its headcount from 19 to 47 employees and is expected to generate RM7 million from its services to Keysight in 2014. Myreka revenues are expected to reach RM30 million by 2024.

The growth of CEEDTec and Myreka has also spawned second-tier local vendors who provide technology to support areas such as PCBA, precision metal works and tooling as well as high density transformers.

To date, CEEDTec and Myreka are working with seven local SMEs, creating more than 200 high-value jobs.

There are now also several major design, development and certification facilities in the country, notably comprising EIDC, NI-AIN and QAV.

### QAV

Following the success of QAV's Testing & Certification facility in the Northern Corridor Economic Region, it has established another testing facility in Subang. QAV also helped increase LED exports and at the end of 2013, obtained accreditation from the American National Standards Institute (ANSI) with capabilities for military and aviation testing.

### EIDC (ECO-INDUSTRIAL DESIGN CENTRE)

The RM6.5 million Eco-Industrial Design Centre (EIDC) was established by SIRIM as an initiative under this NKEA. The EIDC is located at SIRIM Bukit Jalil and offers assistance to local industries in the production of



SLA 7000: Components produced by this machine are normally for die and mold inserts, jigs & fixtures. They are suitable for high temperature environments



Connex 350: The machine is capable of producing functional prototypes. Common application areas are die and mold inserts and over-mold prototypes

environmentally-friendly products through eco-innovation. The centre will create a pool of industrial designers through talent development programmes in collaboration with local training institutes.

EIDC also conducts training for Life Cycle Assessment (LCA) and offers product life cycle consulting services and greenhouse gases accounting, also known as carbon footprint calculation.

To date, the centre has provided 100 Rapid Prototyping Services to at least five sectors besides the electrical and electronic sector. It was also utilised by Straits Design Sdn Bhd for the design of a LED downlight/luminaire for three eco industrial design projects, by Starlite Electrical Industries Sdn Bhd for the manufacturing of a switchboard with improved environmental performance and by Basis Bay to establish the criteria for a green data centre.

A total of 14 SMEs have benefited from the EcoInnovation Consulting Services. Furthermore, 33 EcoInnovation workshops have been organised for SMEs, Government agencies and the academia, while six EIDC services on product sustainability evaluation based on LCA have been utilised.

The centre has also collaborated with local universities and institutes such as Universiti Tun Hussein Onn, Segi University and Ensearch Malaysia.

### KEY TAKEAWAYS

SIRIM is collaborating with National Instruments to provide more comprehensive industrial design services to SMEs. They will also be working with SME Corp to raise awareness of their facilities among SMEs to ensure they facilitate projects from design, prototyping, proof-of-concept to system customisation.

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## EXPANDING WIRELESS COMMUNICATIONS

### AND RADIO FREQUENCY IDENTIFICATION (RFID)

The National Centre of Excellence for Sensor Technology (NEST) at Universiti Putra Malaysia's Faculty of Engineering, in collaboration with MIMOS, Kontron and Intel, conducted a proof of concept on wireless sensor network technology for precision agriculture in 2011. Since then, the investment has spurred:

- Automation in Agriculture
  - Intelligent Greenhouse System (Pilot) with the Ministry of Agriculture and Agro-based Industry
- Innovation in Wireless Technology
  - Intelligent Palm Pollination System (Commercialised) with Felda
  - Shrimp Farm Management System (Pilot) with Blue Archipelago
  - Premium Fish Breeding System (Pilot) with Aqua Grow
  - Algae Integrated Management System (Pilot) with Algaetech International

#### KEY TAKEAWAYS

This technology is continuously being adopted by industries in Malaysia, with further opportunities in areas such as river and air pollution monitoring, oil palm harvesting and slope monitoring. In addition, MIMOS is working with industry partners on at least four high-impact projects which will see their Wireless Sensor Network products taken into commercial applications.

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## GROWING AUTOMATION EQUIPMENT MANUFACTURING

NCIA has been working with 12 companies to introduce locally made automation products into AMD's workstream in 2014. These 12 companies exceeded the year's target of introducing three local M&E companies into AMD's workstream. The companies comprise:

1. SEMI Integration
2. Silkrom Technologies
3. Vitrox Technologies
4. Walta Engineering
5. TTVision Technologies
6. Polytool Technologies
7. Waftech
8. Xlent Innovator
9. FAS Integration
10. Wintech
11. R&M Electronic
12. JSI System

#### THE NATIONAL INSTRUMENTS ACADEMY & INNOVATION NUCLEUS (NI-AIN)

NI-AIN is located at Technology Park Malaysia and is targeted mainly at SMEs. It provides shared technology infrastructure in the areas of human capital development (training, certification and talent development), SME incubation (design, system integration, system customisation and engineering services), and SME intellectual property rights creation and commercialisation.

Benefits seen by these SMEs in utilising the NI-AIN facility include cost savings for initial investment and access to technology tools. The facility also serves as a networking hub and business enabling platform for SMEs to meet with potential clients, collaborative partners and Government agencies.

National Instruments worked with eight companies which undertook 20 new automation projects in system design and prototyping at the NI-AIN shared facility. The companies comprise:

1. Virtual Instrument & System Innovation
2. iRadar

3. Advenxus Solution

4. P&P Tech

5. GoAutomate

6. Avialite

7. Infineon Technologies

8. Creative Precision Engineering

However, the number of projects undertaken during the year fell slightly short of the target of 25 new automation projects. National Instruments will be

collaborating with SME Corp to create a greater awareness among SMEs about their facilities.

Moving forward, 2015 is expected to see growth in local M&E automation companies collaborating with MNCs in process automation, while AMD's automation project will see a completion of 22 projects with 12 local M&E companies.

## KEY TAKEAWAYS

To grow the automation sector, local companies must be encouraged to collaborate with other MNCs. National Instruments is also working with SIRIM to complement their industrial design services, ensuring that the EIDC and NI-AIN provide comprehensive services for SMEs to utilise.

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# BUILDING TRANSMISSION AND DISTRIBUTION COMPANIES

Toshiba Transmission & Distribution Systems Asia Sdn Bhd (TTDA) has grown its business operation in transmission and distribution equipment manufacturing as well as turnkey engineering services, employing 340 workers currently from 150 workers three years ago. The company has also registered a twofold increase in revenue from the manufacture of medium voltage switchgears, control panels and distribution boards which have penetrated international markets such as the Middle East, Australia, Thailand, Cambodia, Singapore and Indonesia.

Separately, a local company is pursuing collaboration with an international accredited short circuit testing liaison (STL) company to establish a centre for testing and accreditation of high-power voltage equipment. The centre, which is still pending approval, will be a key enabler to grow transmission and distribution companies, contributing to high value-add technology transfer to Malaysian companies.

With transmission and distribution products such as switching apparatus, distribution boards, control panels, transformers, cables and conductors requiring certification by accredited STL labs for international market acceptance, the centre will also create opportunities for Malaysia to attract companies seeking testing and certification at a lower cost compared to significantly high testing and certification costs in Europe and Japan.

## KEY TAKEAWAYS

In line with the objectives of this EPP, TTDA aims to become the leading transmission and distribution systems company in Southeast Asia, focusing on the core business of:

- Manufacturing of medium voltage Transmission & Distribution (T&D) equipment
- Engineering, Procurement & Construction Contractor (EPCC) for T&D Projects

- Power network control and automation systems
- Total energy solution systems (i.e. renewable energy, grid energy storage)

A Smart Grid lab focusing on an advanced meter infrastructure pilot project, its policy as well as industry development led by the Energy Commission was conducted in April 2014. Some of the outcomes from the lab include the establishment of a Smart Grid industry association and the development of an appropriate governance structure, led by the Government and representatives from the industry association, to look into Smart Grids. These will act as enablers to Smart Grid component manufacturing and system integration services, especially in manufacturing and deployment of smart meters.

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## BUILDING AN ELECTRICAL HOME APPLIANCE MANUFACTURING HUB

### AND INTERNATIONAL DISTRIBUTION NETWORK

Over the course of this year, Pensonic collaborated with several technology partners to develop a new range of mobile devices targeted for distribution to 50 countries. Additionally, construction of Pensonic's new R&D building in Penang reached 93 per cent completion, with the company expected to move in by early 2015. The facility will serve

as its new operational headquarters housing its R&D department and all other operational departments.

#### KEY TAKEAWAYS

In 2015, this EPP's key focus will be on strengthening Pensonic's brands and ensuring that Pensonic's International Distribution Network

creates opportunities for the entry of its appliances into more markets. This will also open doors for other local brands to market their products internationally. For the 2015 financial year, Pensonic targets to record RM380 million in sales, an increase of 1.7 per cent from their 2014 financial year.

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## DEVELOPMENT OF BALANCE OF SYSTEMS

### FOR SOLAR PHOTOVOLTAICS (PV)

MIDA approved a manufacturing licence for one solar PV balance of systems company this year. This was classified as one of MIDA's high-quality projects.

MATRADE is also working closely with the Malaysian Photovoltaic Industry Association (MPIA) and local system integrators on total PV solutions to be exported through trade missions to Myanmar, Cambodia and Qatar.

Balance of Systems (BoS) involves all components of a PV system other than the PV panels. This includes inverters, battery storage for off-grid systems, power management systems, cables, controllers and mounting structures.



Solar farm at Tok Bali, Kelantan



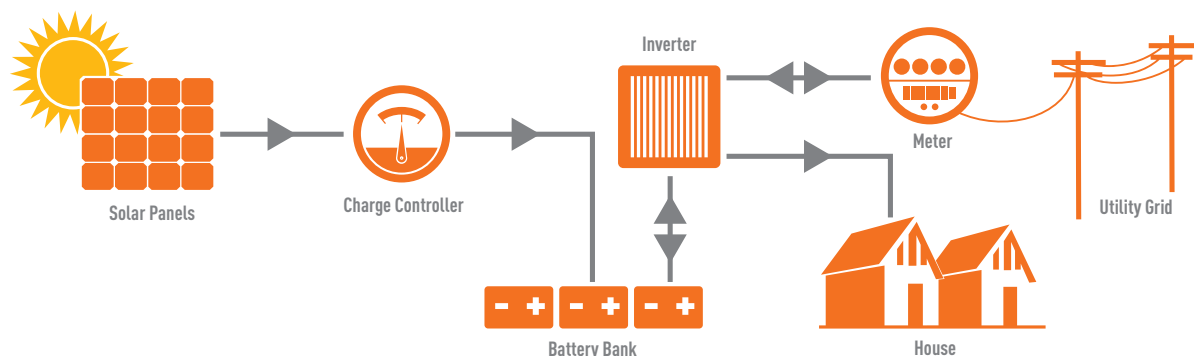


Exhibit 7.4: Inverters, controllers, smart meters and battery storage are some of the PV BOS components that have market opportunity within the solar industry

### KEY TAKEAWAYS

This EPP will continue engagements with identified companies and further develop the midstream and downstream segments of the solar industry. Relevant agencies such as the Sustainable Energy Development Authority of Malaysia

(SEDA Malaysia), Malaysian Green Technology Corporation (MGTC), MIDA and SME Corp will also collaborate to identify additional opportunities to leverage established energy efficiency and energy access programmes for the downstream ecosystem.

These will focus on inter alia off-grid solutions as part of improving rural basic infrastructure. SEDA will work on a framework for a 20,000 residential solar rooftop programme, while MPIA will explore and propose net metering best practices for KeTTHA's further consideration.

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## GROW THE EMBEDDED SYSTEMS INDUSTRY

Embedded systems are a key building block for IoT that will provide creative transformation for industry development. Modern devices need to be increasingly "intelligent" and this intelligence resides in embedded systems – tightly integrated hardware and software designed to perform dedicated functions.

This EPP will be the catalyst to this emerging opportunity and develop the embedded systems industry as a new

source of growth alongside the growing global embedded systems market. This will be achieved by capitalising on Malaysia's established electronics ecosystems and skilled local embedded systems enterprises.

A total of 14 embedded systems projects have been approved to date since 2012, including three new projects in 2014: automotive, vessel & asset monitoring, and educational robotic kits.

The initiatives identified under this EPP include:

- To develop embedded systems projects that produce locally developed embedded systems products to compete in the world market or fulfill certain niche markets
- To grow the embedded systems industry ecosystem via industry collaborations with embedded systems technology leaders and other embedded systems-related ecosystem parties to develop the local capabilities of the industry.



This EPP is private and public sector-driven, and is helmed by MDeC with support from leading technology partners, namely Intel, National Instruments, Altera, CISCO and Wind River, together with other key ecosystem parties including MIDA, MATRADE, NCIA, MIMOS, Penang Skills Development Centre, SIRIM, SME Corp, CREST and TalentCorp.

Motorola, a leading provider of mission-critical communication solutions and services for enterprise and Government customers opened its new centre in Penang, known as the "Innoplex." Equipped with state-of-the-art laboratories and product design and development capabilities, the centre will focus on developing the next generation of mission-critical Land Mobile Radio (LMR), broadband-LTE devices and system solutions for the company's customers throughout the world.

Innoplex is currently the company's largest R&D facility outside the US and will assist in integrating the company's operations in Penang into a single site.

Moreover, the new one-stop design centre will employ 1,200 engineers and support associates onsite and also accommodate teams from various disciplines including industrial design, software, electrical and electronics engineering, mechanical engineering and programme management.

The laboratories are fitted with advanced test equipment to conduct rigorous compliance testing of radio communications products, along with development of new products. The Innoplex will also help the company consolidate all its R&D functions, creating an ideal environment for improved productivity and operational efficiency.

## KEY TAKEAWAYS

The key challenges faced by this sector are a small domestic market, low awareness on embedded systems products and services and a preference for foreign products. To address these challenges, programmes and platforms are required to create business matching opportunities between embedded systems players and end-buyers.

To further grow this segment, national impact projects must be created by adopting embedded systems technologies in industries with huge global market potential such as healthcare, agriculture and green energy. Government support and policy are also required to drive the adoption of embedded systems in vertical sectors to serve as a reference point to target export markets.

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# ENABLING ELECTRIC VEHICLE COMPONENT MANUFACTURING

During the year, GO Automobile Sdn Bhd, a local company, received the first Electric Vehicle (EV) manufacturing licence. This move is aligned with the target to develop a local EV industry under the National Automotive Policy.

Home-grown electric scooter maker Eclimo Sdn Bhd, meanwhile, is expanding its production due to growing demand for electric scooters, especially in delivery services and the tourism industry. Eclimo's technology ensures almost zero energy loss and uses the latest lithium-ion batteries.



BYD electric bus deployed as public transport in the city of Melaka

The Malaysia Automotive Institute (MAI), ARCA Corporation Sdn Bhd, AutoCRC Ltd and Swinburne University signed an MoU in 2014 to develop and manufacture electric buses, lithium-ion batteries and a commercial vehicle tracking system. Swinburne's Electric Vehicle Research Group is one of the world's leading groups in electric vehicle R&D, policy and education. This includes battery technology and management, drivetrain and electric motor technologies, light weighting and vehicle design. To support this new industry in Malaysia, best practices and foreign technologies are to be shared by MAI, MGTC and EV industry players.

This Li-ion battery factory for EV will only be operational after the completion of its prototyping in 2015.

The plan is now to form a consortium that will undertake an integrated design and manufacture approach. MAI is facilitating the process with GO Automobile Sdn Bhd and ARCA Corporation Sdn Bhd as the potential private investors to establish the plant by 2016.

29-seater BYD-K9 electric buses will be assembled locally by AMDAC (M) Sdn Bhd. The buses operate at a range of around 250-300 km on a single charge. Lithium ion phosphate batteries have a lifespan of around 6,000 charges, which translates to about 16 years of operating service.

Moving forward, Prasarana Malaysia Bhd will introduce 15 electric buses in its Sunway Line Bus Rapid Transit

(BRT) in 2Q 2015 while Panaroma Melaka Sdn Bhd will introduce 40 electric buses in 2015 for its transport fleet and for tourism-related activities for the state.

### KEY TAKEAWAYS

The introduction of electric buses will serve as a catalyst for the EV industry in Malaysia, especially in the design and manufacture of electric vehicles and their electronic components. By 2020, 2,000 electric buses are targeted to be on the road.

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## SUPPORTING REGIONAL RAIL MRO SERVICES

### VIA ELECTRICAL AND ELECTRONICS COMPONENT MANUFACTURING

During the year, the Land Public Transport Commission (SPAD) appointed a consultant to carry out a National Rail MRO (Maintenance, Repair and Overhaul) feasibility study focusing on the macroeconomics of the rail industry and its financial and economic impact. The continuation of this initiative will be undertaken by the Ministry of International Trade and Industry to foresee the industrial development of this EPP.

This will lay the foundation for the growth of the E&E component industry for rail MRO. It will also pave the way for vendors and system integrators to provide repair services and product development for related electrical and electronic components and systems.

### KEY TAKEAWAYS

National Instruments will explore the possibility of providing shared services for vendors and system integrators to

develop and test E&E design, systems integration and customisation, and IP creation for rail MRO services. This will enhance the ecosystem and its value chain in electric train electronic component manufacturing and related services.

## ENABLING INDUSTRIES THROUGH NANOTECHNOLOGY

The development and rollout of thermal management technology for LED applications is 75 per cent completed as at December 2014 and is anticipated to hit 100 per cent by Q1 2015. The development and use of the technology were delayed due to fund disbursement and negotiation issues which have been resolved.

Nano Malaysia has identified the LED sector as the first entry point for copper-carbon nanotube (Cu-CNT) heat sink technology. Nano Malaysia signed a Technology Licence Agreement with Universiti Teknologi PETRONAS (UTP) in March 2014, and a collaboration agreement with Hans System Design Sdn Bhd, a local LED/SSL designer and manufacturer, to develop and roll out the thermal management technology in LED applications. As of October 2014, UTP has provided the Cu-CNT nanocomposite mixture for low volumes of moulding production. The integration with LED design and testing

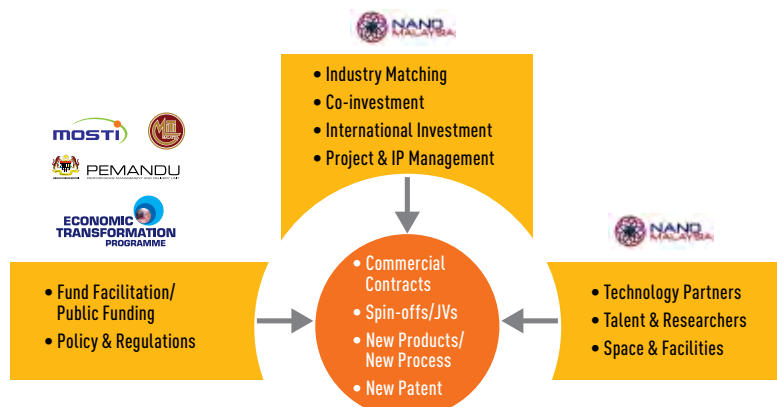


Exhibit 7.5: iNovation Framework for Collaboration

on thermal conductivity and safety have been completed in December 2014.

Agensi Inovasi Malaysia (AIM) completed a study on graphene in May 2014 which includes its applications in the E&E industry. There are two focus areas in adoption of graphene: The enhancement of Li-ion batteries and the establishment of a manufacturing platform for conductive inks technology.

### KEY TAKEAWAYS

Nano Malaysia's new collaborative framework, the iNanovation Platform introduced in early 2014, will help foster effective collaboration between research institutes, institutes of higher learning, Government and industry to ensure successful commercialisation.



Cu-CNT mounting substrate incorporated into LED modules in collaboration with Hans Systems Design Sdn Bhd to manage the immense heat generated by the LED light source making it more efficient and long lasting

## Summary of Electrical and Electronics NKEA

	2020 Target
<b>Incremental GNI Impact</b>	<b>RM53.4 billion</b>
<b>Additional Jobs</b>	<b>157,000</b>

### Critical targets for 2015

- RM6.5 billion approved investments for E&E sector
- 65% realisation of E&E sector investments approved since 2011
- 18 quality projects to be approved
- 20 Eco Design applications undertaken by companies/organisations utilising Eco Industrial Design Centre (EIDC) shared facilities
- Completion of pre-commercialisation of Cu-CNT nanocomposite for thermal management in LED industry
- Two companies undertaking commercial prototypes (Lithium Battery & Conductive Inks) under National Graphene Action Plan 2020 (NGAP2020)
- RM110 million total annual sales of local LED companies under SMECorp capacity building program
- 30 new LED products internationally certified
- Two companies involved in Green Motion Controller (GMC) chip in pre-commercialisation validation and qualification
- 30 Advance Analytical Services provided by local consultants to the industry
- 50 trained engineers and students in Failure Analysis (FA) and Material Analysis
- 50 trained engineers and students in Wafer Testing
- Five wafer testing services provided to local E&E companies
- 30 projects utilising Metrology Lab

