

INVEST-IN-PENANG BERHAD

**STUDY ON THE
LIGHT EMITTING DIODE (LED) INDUSTRY**

PART THREE: ISSUES, CHALLENGES & RECOMMENDATIONS

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Part Three of the “Study on the LED Industry” is the final part of the report. This part of the report attempts to discuss the issues and challenges faced by companies in the LED industry in Penang as well as recommends plausible strategic directions for the State to adopt and implement

1. ISSUES & CHALLENGES

1.1 Presently, most of the materials used in the assembly / packaging of LEDs are imported because of the following:

1.1.1 The materials are not available locally. For example epoxy / silicone and wafer¹.

1.1.2 Prices charged by local companies are not competitive. This could possibly be due to the fact that the raw materials are imported to add value locally. Imported materials could sometimes be cheaper especially if the materials are imported straight into the free industrial zones (FIZs) or licensed manufacturing warehouses (LMWs). On the other hand, locally purchased materials could be more expensive because most of the materials are brought into the principal custom areas (PCAs), where most of the local companies are located. Most of the imported materials are subject to import duties unless the local companies apply for exemption, which will involve extensive documentation and is time consuming. Another explanation for the non-competitive pricing of materials from local companies is that the local companies want to gain huge profit margins.

1.1.3 The materials supplied locally are of poorer quality compared with the imported materials. Local technology might not be as advanced as those in the US, Japan or Taiwan. This prompted the LED packaging companies to purchase from overseas.

1.2 Similarly, most of the machines and equipment used by the companies are imported. All the machines and equipment used in wafer fabrication process are imported. The machines and equipment used in the front-of-line of the packaging process are also imported. These include dicing, die attach and wire bonding machines. On the other hand, locally-made machines and equipment are available for the end-of-line, especially machines and equipment used for testing and tape & reel. Although locally-made machines and equipment are available, some of the companies prefer to use imported ones because:

1.2.1 Prices of locally-made machines are not competitive.

1.2.2 Locally-made machines are of poorer quality. For example, ramping-up using imported machines and equipment could be much faster than locally-made ones.

1.3 The LED industry is still dominated by large foreign firms. Presently, there are only a few local companies that are involved in the LED industry, especially in packaging. None is actually involved in the upstream activities like wafer fabrication. Although

¹ Except for Osram which has its own wafer fabrication plant in Penang.

there are also local companies that are involved in system integration, they are still considered as low cost manufacturers for the export market.

- 1.4 Human resource is still an issue as companies are still facing difficulties in hiring people with the right skill sets to meet their requirements. The mismatch between supply for and demand of human resource is a concern. Companies require their new hires to be on the job immediately. On the other hand, fresh graduates are not equipped with the know-how of applying what they have learnt on their jobs.
- 1.5 The adoption rate of LED by local consumers is low. Although the Malaysian government has announced to ban the use of incandescent bulbs by 2014, there is no law or legislation that promotes the advantages of LED. Prices of LED lightings are more expensive than that of compact fluorescent lamps (CFLs). A ban of the use of incandescent bulbs could translate to the increase in the use of CFLs rather the LED lightings.

2. RECOMMENDATIONS

- 2.1 The LED packaging and component making industry in Penang has matured. Penang can no longer depend on this activity. This is because Penang does not only have to compete for investments from major global LED companies but Penang also has to compete with China, that has a few thousands companies ranging from small to large in LED packaging activities today. In order to grow beyond the current activities and to sustain the industry in Penang, there is a need to expand capacities.
- 2.2 By virtue of the nature of the LED industry, it is less plausible for Penang to expand upstream into wafer fabrication and epiwafer.
- 2.3 In order to play a major role in the LED business, it is important for investPenang to promote and encourage LED integration industry in complementing businesses such as LED modules, LED fixtures, lighting control system solutions, and even medical devices.
- 2.4 The expansion into LED integration industry, especially on complementing activities as mentioned in 2.3 is expected to promote and increase domestic consumption on LED components, help to sustain the LED packaging business in Penang as well as 'go green'.
- 2.5 It is advantageous to move towards LED integration industry, including LED lighting, because this industry generates better profit margins as compared with LED packaging. Such industries are mushrooming in countries like Taiwan and China. Major companies that have repositioned themselves to be involved in the LED integration industry include giants like Foxconn, Delta Electronics, Chimei and AUO from Taiwan as well as Midea & TCL from China.

- 2.6 Penang should also capitalize on the availability of expertise in design at system integration level as well as expertise in LED training to promote and develop the LED integration industry amongst the local technopreneurs.
- 2.7 Areas Penang could participate in the LED integration industry include the following:
- 2.7.1 LED SMT (surface mount technology) services
 - 2.7.2 Manufacture of metal core printed circuit board
 - 2.7.3 Expand SMI box built industry into building, testing and qualifying products
 - 2.7.4 Promote and build optical injection moulding industry
 - 2.7.5 Promote foreign investments in high thermal conductive material to promote LED application
 - 2.7.6 Strengthen SMIs in casting and metal fabrication to become high volume producers
 - 2.7.7 Promote, spawn and develop SME optoelectronics module and system integrators in:
 - Lighting retrofit
 - Lighting fixture
 - Lighting module
 - Lighting system
 - Lighting designer / architect
- 2.8 Incentives that are deemed beneficial to local companies to encourage them to be involved in the LED industry are:
- 2.8.1 Support on land and building
 - 2.8.2 Subsidy on high tech equipment for manufacture of core LED components
 - 2.8.3 Abolish hiring restriction on foreign knowledge-workers / ease to bring in expertise from overseas
 - 2.8.4 Import duty exemption for core raw materials
 - 2.8.5 Tax exemption on domestic sales of advanced LED products

3. CONCLUSION

- 3.1 The adoption and implementation of LED applications have increased significantly over the past years. As a sunrise industry, it is imperative for Penang to aggressively promote the industry. Infrastructure and human resource need to be put in place to promote this next wave of industrialization.

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