

Penang , the Region's LED Hub in the Making

By Anna Ong

Penang has built its reputation as the Silicon Island of the East through its almost forty years of experience in the export-oriented electronics industry. The Who's Who amongst the electronics giants, especially Intel and AMD were very young companies then, when they first set their foothold in Penang.

Many of the companies which set up operation in Penang in the early 1970s and 1980s are still thriving in Penang because of the State's competitive advantageous, which include human capital, world class supply chain, pro-business and friendly government as well as excellent infrastructural facilities. The State also has to thank the transnational corporations that have established their operations here in spawning and developing the local supporting and ancillary industries.

Today, the electronics industry supply chain in Penang has attained global recognition and is diversifying fast into other areas of growth. Whilst the electronics industry is still the main engine of growth for the Penang economy, other growth sectors have been identified by State's policy makers as the next wave of industrialization. These growth sectors include light emitting diodes (LED), photovoltaic (PV), medical devices & equipment, product design & development, software design and shared services.

Why Penang?

Penang is set to become the LED hub in the region not only because of the fact that the LED industry was one of the pioneer industries that first set up offshore operation in Penang in the early 1970s but because Penang has what it takes to be the region's LED hub.

Today, Penang has the presence of three (3) of the 2009 world's top five (5) LED makers. Osram which ranked number 2 in 2009 has its wafer fabrication as well as assembly and test operations while Lumileds which ranked number 5 has its assembly and test operations in Penang . The third company has its contract manufacturer in Penang, producing a major portion of its LED products.

In addition to the presence of these three LED conglomerates, other LED companies in Penang include Avago and SILQ, a local joint-venture company with Semileds as well as local contract manufacturers such as Globetronics and CS Opto.

Why LED?

The LED industry is poised to grow in the next few years, driven by increased LED penetration rates in mobile handsets, notebooks, LCD (liquid crystal display) televisions (TV), automotive and general lighting. Forecasts by Credit Suisse show that the LED market will grow 13.3% in 2010 and 19.0% in 2011. The LED application share in 2010 will be predominantly handsets (27%), automotive (13%), general lighting (11%), LCD television (10%), notebooks (9%) and netbooks (3%).

The LCD TV backlighting or signs & displays segment will be the most important LED growth driver over the coming years. The segment is expected to double its growth rate in 2011 over the 2010 figure to 20%. A Strategies Unlimited 2009 forecast indicated that for the 5-year period between 2008 and 2013, this segment is expected to grow by 55.4% annually. The LCD TV backlights require between 400 and 5,000 LEDs per TV set, depending on the technology, compared with an average of 14 LED per mobile phone.

Another important segment is general lighting, which is expected to grow by 12% in 2011 or 40.3% per annum for the period between 2008 and 2013. Some countries have imposed environmental regulations to phase out or ban the use of incandescent lighting. Malaysia has recently announced to gradually phase out the use of incandescent bulbs by 2014 but has drawn a lot of comments and negative feedback from various parties who complaint about additional cost to be incurred. Other countries that have introduced such regulations include US (by 2014), Canada (2012), EU (2012), Australia / New Zealand (2010), China (2017), Philippines (2010), Taiwan (2013) and India (2012).

LED lightings have initial high capital costs compared with other forms of lighting. However, taking into consideration the long term effect of LED lighting over incandescent bulbs and CFL (compact fluorescent lamp), LED lighting will give better return of investment. For example, a 500 watt incandescent bulb costing US\$2.25 will emit 8000 lumens of light compared with a 78 watt LED lighting, costing US\$843, emitting the same amount of 8000 lumens. However, the life span of an incandescent bulb is only 1,000 hours compared with 50,000 hours for LED. Furthermore, electricity consumption per year (kWh) for LED lighting is less than the electricity consumption per year for incandescent bulbs, namely by about 6 to 7 times lower. This means that the total electricity cost per year for using LED lighting could be as low as 16% of total electricity cost of using incandescent bulb. The lower cost in terms of electricity consumption coupled with zero maintenance cost for LEDs (as opposed to other forms of lightings), the overall annual cost of LED lighting could be a low as 40% of the of overall annual cost of using incandescent bulb.

Penang's Competitive Advantage

There are frequent questions on whether Penang should attract more LED players or the present numbers of players that are already in Penang suffice. Looking at the present LED ecosystem in Penang, there is only one wafer fabrication facility but there are a number of LED packaging facilities. However a mapping of the LED packaging supply chain indicates that most of the materials used for packaging are not available in the country. These materials are either imported directly from overseas or are purchased from companies locating in Penang that add value to the imported materials.

A quick scan of the existing LED companies in Penang also suggests that these companies are not in favour of having more 'chip level' player or LED packaging facilities setting up in Penang. Several reasons are given for this judgement. First of all, most of the raw and intermediate materials are not available locally. As such, spawning and developing local capabilities in the LED packaging supply chain might not be as effective as planned.

Areas identified for local talents to be involved in the LED industry are actually at the system integration level, namely in the design and development of LED modules and LED final products. Discussions with some LED finished product companies operating in Penang, especially in the areas of general lighting, retrofit markets as well as LCD backlighting for industrial equipment show that the design as well as the manufacture of the final products are done in Penang by local engineers but the products are being sold in the US, Europe and some large Asian countries like Japan. Most of the LED final products that are designed and manufactured here are not being sold in Malaysia. Our domestic market accounts for less than 1% of the total market for these products.

With such capabilities available locally, Malaysia should be proud of its home grown design and development engineers. Such talents should be further encouraged and developed to build the State's pool of k-workers as well as to build the LED cluster, especially final LED products in Penang. The existence of LED final product design capabilities also help to develop local contract manufacturing companies to produce the final products.