The Worldwide Industrial Electronics Assembly Markets Defined

The industrial products industry for electronics assemblies is large and diverse. It is very attractive and profitable for many EMS suppliers because of the wide range of complex and high mix of electronic product assemblies. But it is also mysterious and vague unless one understands the specific application for electronic content embedded within each product. Both OEMs and EMS seek participation of the other, because cost-reductions of these assemblies are mandatory, so good partnerships are essential for staying competitive in this evolving industry.

We have segmented the industrial product market into four categories for easy understanding. These categories include process control, test & measurement, 'other' industrial, and clean energy. Table 1 summarizes the total available market for electronic cost of goods sold (E-COGS) of industrial assembly products by market segment and geographic region for 2012.

Table 1: Industrial Products E-COGS Market by Category and Region ($M), 2012

Industrial Segments	Total	Americas	EMEA	APAC
Process Control	33,607	13,281	8,924	11,401
Test & Measurement	26,533	4,635	5,164	16,734
Other Industrial	22,803	7,475	4,302	11,027
Clean Energy	12,342	1,381	7,063	3,899
Total	**95,285**	**26,772**	**25,453**	**43,061**
Percent		28.1%	26.7%	45.2%

The market for industrial product assembly has been growing at approximately 5-7 percent annually, however, the EMS product assembly market has been growing at a much higher rate because of the economies of scale inherent with the outsourcing value-proposition. To date, EMS assembly accounts for

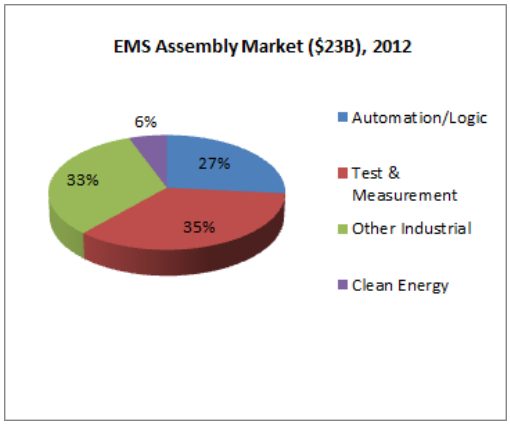
approximately 23 percent of the total available market for industrial electronic products in terms of revenue, but this percentage is increasing dramatically as the outsourcing is demonstrated. The largest industrial product market to date is Test & Measurement equipment sector which is also the most electronic-intensive. Table 2 summarizes the EMS market for all industrial products E-COGS assembly by product segment and geographic region for 2012.

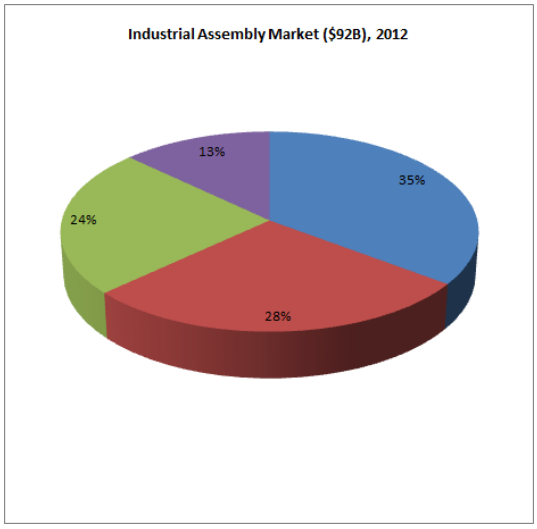
Table 2: EMS Industrial Products E-COGS Market by Product and Region ($M), 2012

EMS Assembly	Total	Americas	EMEA	APAC
Process Control	5,721	1,752	1,817	2,152
Test & Measurement	7,527	1,416	1,518	4,593
Other Industrial	7,063	3,476	1,701	1,886
Clean Energy	1,212	321	600	291
Total	**21,523**	**6,965**	**5,636**	**8,922**
Percent		100.0%	80.9%	128.1%

EMS Assembly %	Total	Americas	EMEA	APAC
Process Control	17.0%	13.2%	20.4%	18.9%
Test & Measurement	28.4%	30.6%	29.4%	27.4%
Other Industrial	31.0%	46.5%	39.5%	17.1%
Clean Energy	9.8%	23.3%	8.5%	7.5%
Total	**22.6%**	**26.0%**	**22.1%**	**20.7%**

Figure 1: Industrial Products E-COGS Market by Supplier ($M), 2012





Process Control

Industrial process control is comprised of 13 leading product segments according to our field research and include automation/programmable logic control, construction/agricultural/mining, electric motors, electrical distribution/smart grid, elevator systems, environmental management, fluid control/hydraulics, marine/waste water, oil/gas, power supplies, robotics, smart meters, and UPS/batteries. By far, the leading application is automation/programmable logic control which is embedded in nearly every aspect of this market. The leading region for the assembly of these devices is the Americas followed by APAC as most Asian OEMs prefer to manufacture in-house. The electronics content of process control equipment varies considerably by individual product, with automation/logic (primarily PLCs) and smart meters having the highest concentration.

Our research has identified approximately 52 leading 100 industrial OEMs companies which are estimated to account for approximately 80 percent of all process control products. Leading suppliers include GE Industrial, Siemens, ABB, Hitachi, Yokogawa, Schlumberger, Mitsubishi, Emerson, Fujitsu, Bosch and many others. Most market leaders have internal low-cost manufacturing operations in all geographic regions yet employ a variety of EMS subcontractors in areas where it makes economic sense in terms of supply and demand. The majority of subcontracting involves printed circuit boards (PCBs), and in some cases, the final integration or 'box' assembly of the industrial product.

The test and measurement industry is challenging to segment given the wide range of high technology products, but we have profiled this by equipment size, applications and customer base. We have identified four distinct T&M equipment sectors which include inspection equipment, metrology/instrumentation, semiconductor capital equipment, and general test and measurement hardware found in the home and industry. The leading region for manufacturing and consuming these devices, by a very wide margin, is the APAC region. While semiconductor manufacturing exists extensively in the Amercias and EMEA, Asia has become the dominant region for most testing of semiconductor products because of the many end products such as mobile phones and personal computers.

Our survey profiled 24 leading industrial OEMs that currently manufacture test and measurement equipment. Major suppliers include Applied Materials, Tokyo Electron, Thermo Fisher, Agilent, Lam Research, Rohde & Schwartz, Parker Hannifin, ASML, Yokogawa, among others. Most large companies have transferred their manufacturing facilities to low-cost manufacturing operations in the APAC region and their subcontractors have followed this trend in support. In most cases, the OEM is responsible for the final integration or 'box' assembly of the industrial product while the EMS subcontractor manufactures the complex PCBs that account for the highest proportion of semiconductor electronics assembly. In certain cases, such as with small handheld test equipment, the EMS company will assemble and ship the entire product (PCB and box assembly).

'Other' industrial products comprise applications that do not fit neatly into a clear sector, sometimes defying classification altogether, but include ATM/gaming equipment, HVAC, laundry/home appliances, lighting/LEDs, security/safety products, tools, and material handling/specialty equipment/other industrial hardware. Many of the sectors are quite large, such as the LED lighting systems sector, while others are composed of multiple companies and derivative products, such as HVAC and home appliances, which nevertheless constitute significant markets, albeit minor ones for electronics assembly overall (that is, the electronic content is less than 10% of the overall COGS). As we have uncovered, the range of products is very extensive but they are rich in electronics assembly potential.

Our survey identified 42 leading industrial OEMs that manufacturing 'other' industrial equipment. Setting aside the LED lighting industry for the moment (which includes OSRAM, Philips Lumileds, Nichia, Panasonic and Samsung),

leading suppliers include Siemens, Cooper Industries, NCR, Electrolux, and United Technologies among others. In many cases, the large OEM companies maintain their own low-cost manufacturing facilities or employ subcontractors for the production of PCBs. In some cases (such as with ATMs/gaming/vending machines), EMS companies play a vital role given the complexity of semiconductor electronics on the PCB. For other products, such as tools and security products, the PCB assembly is not significant given the overall assembly of the product.

While there is no standard definition of clean energy technology, we have defined it as a diverse range of products, interfaces, and processes that harness renewable materials and energy sources, and thereby reduce the use of natural resources, and cut or eliminate emissions and wastes. We have focused on renewable technologies such as wind power, solar power, tidal, wind and fuel cells (and the necessary inverters), and the demand by consumers to manufacture these products cost-effectively.

Our survey of the clean industry sector includes market leaders such as LDK Solar, First Solar, SunTech Power, Q-Cells, SunPower, Trina Solar, Canadian Solar, and Solar World among many others. The size of the solar energy sector far exceeds the current market size of the wind, tidal and fuel cell sectors. Inverters naturally apply to all of these products sectors and remains the primary product application for outsourcing.

The *Worldwide Industrial Electronics Assembly Markets—2012 Edition*, is based on an in-depth examination of the top 100 industrial OEM companies as well as their outsourcing partners. Our forecasts conform to the research described in our sister publication, *The Worldwide Electronics Maufacturing Services Markets – 2012 Edition.*