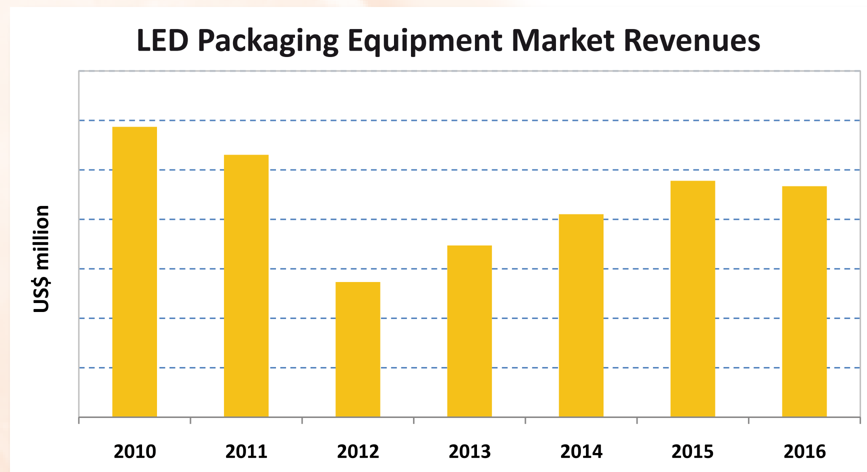
LED Packaging Report 2011

MARKET & TECHNOLOGY REPORT – JULY 2011

Packaging typically accounts for 20% to 60% of the packaged LED total cost and therefore represents the single largest opportunity for cost reduction

MORE THAN $2B WILL BE INVESTED OVER THE 2011-2016 PERIOD IN NEW EQUIPMENT FOR LED PACKAGING (LLO, PERMANENT BONDING, SINGULATION AND TESTING)

LED packagers are still using mostly retrofitted equipment from the IC industry and relying on existing technology solutions and materials to improve LED cost of ownership and performance. While this has allowed LED manufacturers to benefit from decades of research and development and investments in the IC industry, it also constrains the industry into the space defined by existing technology platforms that are not optimized for the specific needs of LEDs. But the industry has now gained enough momentum and reached a critical mass to entice equipment and material providers into developing dedicated solutions for LED manufacturing. Many dedicated solutions are emerging from existing and new players that will allow significant reduction in LED manufacturing cost through improved yields, throughputs and material efficiency.



LED packaging equipment market forecast to 2016.
Including substrate separation (LLO), permanent bonders, die separation (diamond scriber, laser scriber, blade dicer, laser dicer), in-line tester (Wafer, die and package inspection, probers, sorters, tapers…), die-bonder…etc…

LED PACKAGING EQUIPMENT OVER-INVESTMENT IN THE LAST 2 YEARS LEADING TO A SHORT DOWN-CYCLE STARTING IN 2012

No LED manufacturers want to get caught short of capacity when the general lighting market scheduled to reach $20B by 2020 takes off. Thus, an unprecedented investment cycle started toward the end of 2009 and will extend through early 2012. This cycle initiated in Korea is now essentially fueled by subsidies and other incentives in China, as the country is aggressively trying to position itself as a future leader in solid state lighting. New entrants are investing massive amounts of money in order to displace existing manufacturers. This will lead to a world averaged overcapacity that will briefly exceed 50% for some tools (ie: capacity utilization rate of <50%) by mid-2012.
This in turn will cause a 12-18 month down cycle corresponding to the absorption of this overcapacity as well as some consolidations that will bring the industry back to more usual utilization rates of 80%. This down cycle will extend through mid-2013. Then we expect a new investment cycle to kick in to respond to further increasing demand for general lighting. This might lead to another shorter excess investment to be absorbed in 2016.

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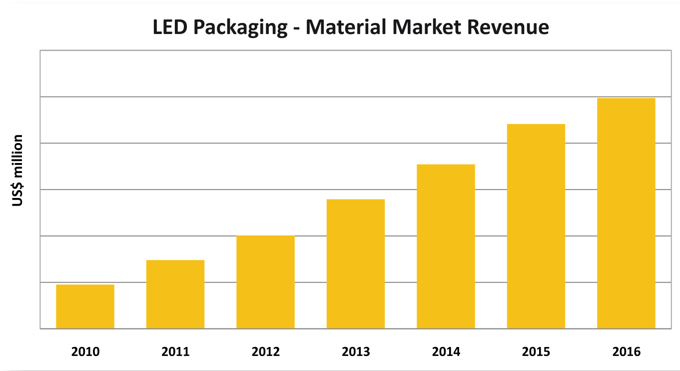
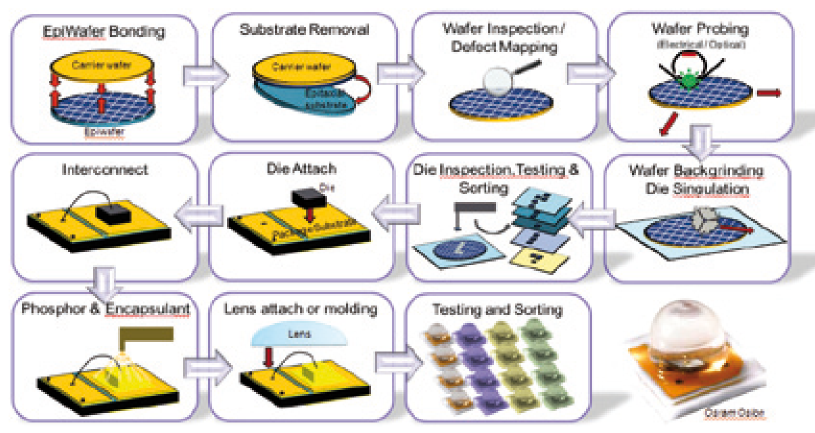
MATERIAL AND COMPONENT SUPPLIERS WILL ENJOY A SMOOTHER RIDE WITH REGULAR GROWTH AT A CAGR OF 27.6% BETWEEN 2011 AND 2016.

Package substrate makers will see the fastest growth with a CAGR of 45% through the period. Phosphors will experience strong price pressure but still enjoy double digit growth with a CAGR of 12%. With the intensifying competition, players try to differentiate themselves by proposing an increasingly wide variety of technology options for LED packaging. Substrate material options as well as assembly and interconnection techniques abound as as many workarounds to the limiting patents of the established players. New players from the general semiconductor markets propose new solutions based on their respective capabilities. Similarly to IC packaging, new technologies for LED packaging add up to the existing ones without completely phasing them out. And there's still a lot of room for innovation that could allow capturing more added value. For such products however, it remains paramount that the solution offers an overall reduction in cost of ownership ($/lumen) to LED manufacturers.



LED packaging material and consumable market forecast to 2016. Including package substrate (Ceramic, lead-frame, silicon, metal...), phosphor powder, encapsulation and primary optics, ESD chip.



Overview of main LED packaging steps covered in the report

This report reviews the major challenges associated with the key LED packaging process steps, and insights are shared on the pros and cons of the various technology options and their future forecasted trends.

It focuses especially on the most recent technologies and market trends for high power LED and packages and arrays and provides quantification for various materials and equipment associated with each of those key steps. Trends are analyzed in detail including emerging technologies like Silicon substrates, Wafer level packaging, COB etc...

COMPANY INDEX

3M, A-Bright, ACC Silicon, Accretech, ADT Dicing, Advanced Photoelectronic, ALSI, AM Technology, Amceram, American bright, American Opto Plus, AOT, Apeax, APT, Asahi Glass, ASM Pacific, Assymtec, Autec, Avago, Axxon, Bayer, Bergquist, Brightled, Brightview, BYD, Cascade Microtech, Century epitech, Ceramtec, Ceratech, CETC, Chroma, Citizen, CMO, Cofan PCB, Cree, CS Bright, Curamik, Daitron, Datacon, Delphi Laser, Denka, Dian, Disco, Dominant semiconductor, Doosan, Dow Chemical, Dow Corning, Dowa, Dupont, Dynatex, Edison Opto, Enfis, Epistar, Epitex, Epoxy Technology, EPWorks, ESEC, ESI, Essemtec, Everlight, EV-Group, Evident Technologies, Excellence, Fangda, Fittech, Formosa Epitaxy, Friatec, GE, Gia Tzoong, Golden Valley, Han's Laser, Harvatek, Hauman, Heesung, Heptagon, Hilight, Holy Stone, Huixin, HuiYuan, Hybond, Hysol (Henkel), Illumitex, Indium Corporation, Intematix, Ipidia, Ismeca, ITRI, Itswell, Iwashita Engineering, JPSA, JT Corp, KCC, Kingbright, KLA Tenkor, Kodenshi, Kulicke & Soffa, Kwality Group, Kyocera, Laurier, Leatec Fine Ceramics, Ledengin, Ledtech, Lextar, LG Innotek, Lighting, Lightscape Materials, Ligitek, Lite-on, Loomis, Lord, Lumens, Lumex, Lumileds, LumiMicro, Luminus Device, Lumitek, Lustrous, Luxpia, LWB, Master Bond, MDI, Microfab Technology, Micron, Mitsubishi Chemical, Mok san electronics, Momentive, MPI, Murata, Nanoco, Nanometric, Nanosys, Natel, Nationstar, Neo-Neon, Neopac, Nexxus Lighting, Nichia, Nihon Garter, NIMS, Ninex, NN Crystal, Nordson Asymtek, Nusil, NXP, Oasis, Omnivision, On chip, On Semiconductor, Optek, Optest, Opto Systems, Optotech, Osram, Palomar Technologies, Panasonic, Perkin Elmer, Phosphortech, Planoptik, Powerlightec, QD Vision, QMC, Quatek, Remtec, Renaissance Lighting, Renesas, Rohm, Rudolph Technology, Saint-Gobain, Samsung LED, Sanken, Sanyu, Seiwa, Semileds, Sentec, Seoul Semiconductor, Shandong Huaguang Opto, Sharp, Shenzen Mason Technologies, Shenzen Mingxue, Shenzen Refond, Shibuya Kogyo, Shinetsu, Shinko, Sibdi, Silian, Siliconwafer Precision Industries, Stanley, Sunpu, Suss Microtech, Synova, System plus consulting, Tai-I Technology, TDK, Tecdia, Tekcore, Thermagon, Ticona, Tong Hsing, Top engineering, Toshiba, Touch Microsystem Technology, Towa, Toyoda Gosei, Tridonic Atco, TSE, TSMC, Uni Via Technology, Unipress, Unity Opto, Verticle, Viking Tech, Visera Tech, Vishay, Waker, WenRu, Wenworth Laboratory, Withlight, Wollemi, Wooree LED, Xiamen Hualian, Xintec, Zeon chemical, Zevac.

BIO

Eric VIREY, Ph.D. holds a Ph-D in Optoelectronics from the National Polytechnic Institute of Grenoble. In the last 12 years, he's held various R&D, engineering, manufacturing and marketing position with Saint-Gobain. Most recently, he was Market Manager at Saint-Gobain Crystals, in charge of Sapphire substrates and materials for optical telecoms.

BIO

Jean-Marc Yannou joined Yole Developpement as technology and market expert in the fields of advanced packaging and Integrated Passive Devices. He has 15-years of experience in the semiconductor industry. He worked for Texas Instruments and Philips (then NXP semiconductor) where he served as Innovation Manager for System-in-Package technologies.

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YOLE DÉVELOPPEMENT

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7. Termination
7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be borne by the Seller, following this decision.
7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.
8. Miscellaneous
All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.
Any notices under these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party.
The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.
9. Governing law and jurisdiction
9.1 Any dispute arising out or linked to these Terms and Conditions or to any contract (orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Lyon, which shall have exclusive jurisdiction upon such issues.
9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.