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NanoMarkets' OLED Lighting Forecast—Q2 2012

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NanoMarkets OLED Lighting Market Forecast – Q2 2012

SUMMARY

In the past year OLED lighting markets and production infrastructure have evolved. For example, office lighting has become a key market target for OLED lighting, while other applications no longer command the interest they once did. At the same time, while some likely future mass producers of OLED lighting seem to be committing more resources, others seem to be failing in their efforts.

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With all this in mind, this report provides NanoMarkets' latest market forecasts for OLED lighting. Our company has been actively tracking the OLED lighting market for more than five years and this report represents a more detailed forecast than any we have ever produced before.

In this report, we consider the revenue potential for the OLED lighting applications that currently interest the OLED market the most. We think these have changed since last year and now comprise luxury consumer lighting, decorative lighting for large buildings and showrooms, office lighting, residential lighting and automotive lighting. Another change in this year's report is that we have provided a much more detailed analysis of pricing trends in OLED lighting than ever before. In particular, in addition to looking at pricing expectations of leading manufacturers, we have also examined the likely roadmaps for pricing by unit, luminance and square meter and how these three measures are likely to correspond.

Obviously, no one can be completely sure of how the developments in the OLED lighting market will ultimately pan out and with that in mind we consider other prominent forecasts for this market including a worse-case scenario in which OLED lighting never succeeds in growing beyond the luxury lighting sector, along with some ultra-optimistic scenarios that have emerged from apparently respectable sources.

The forecasts in this report are in value and volume (square meter) terms and are broken out by applications. We also consider how the OLED lighting market is likely to be shared among various major countries and regions as it evolves. Finally, we examine how our forecasts tie in with the emergence of OLED lighting manufacturing capacity, around the world.

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Chapter One: Introduction—Assumptions, Drivers and Challenges

1.1 Why Do We Need Another Forecast for OLED Lighting?

In the past year OLED lighting markets and production infrastructure have continued to make progress. However, this progress has surely been slower than in previous years, when new technical performance improvements, new products and new facilities seemed to be announced on an almost monthly basis; or at least that's how it seemed.

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1.1.1 OLED Lighting in a Low-Growth World

There are a number of potential explanations why things have slowed down a bit in the OLED lighting market. Almost certainly the state of the worldwide economy has something to do with it. The ultimate goal is to sell OLED lighting on the basis of its energy efficiency, but for now OLED lighting is more or less a luxury item and such items do not easily succeed in difficult economic times.

In this context, NanoMarkets is particularly concerned about the economic situation in Europe, which seems to us to be especially negative for the OLED lighting market because so much of the OLED lighting industry seems to be Eurocentric. The largest suppliers at the present time are Philips and Osram and many of the OLED luminaire companies are also based in Europe.

Of course, most of these companies trade internationally, but European firms of all kinds understandably tend to have a disproportionate part of their business in Europe. And in the case of lighting firms, we note that Europe has always been the focus of high design content lighting fixtures of all kinds.

While the growth rates in the countries that are likely to be the sources of the overwhelming majority of the demand for OLED lighting will inevitably rise and fall over the next decade, the likelihood is that the high growth rates that existed in the economy when OLED lighting was first thought up are not going to reoccur for some time.

And with that in mind, NanoMarkets believes that it is certainly time to rethink our forecasts for the OLED lighting market in a lower economic growth world going forward.

Prospects of inflation: The benefits of long-term efficiencies from using SSL products of any kind are heavily discounted in an inflationary situation and we expect such a situation to arise as the result of governmental monetary policies hurting the prospects for growth in the OLED lighting market.

This kind of monetary-derived inflation needs to be distinguished from the impact of real price rises for energy and a return to hyper-growth in India and China would seem to ensure that higher *real* energy prices are also on the horizon. This could prove positive for OLED lighting as it will for any technology promising energy efficiency.

High unemployment: High unemployment in developed countries may mean less disposable income available for higher-priced lighting fixtures, which, for the time being, is what OLED lighting is. On the other hand, the highest unemployment in Europe and the U.S. is not found in the demographics where OLED lighting is most likely to be sold.

Continued problems in the worldwide construction industry: Such problems rob the OLED lighting industry of new construction opportunities; new buildings are an obvious opportunity for new types of lighting to be installed. If measured by the ratio of rents to capital values, among the major nations, only the U.S. and Japan have residential property markets that can be said to be undervalued and even there, construction markets are slow to recover.

Capital market uncertainties: Continuing uncertainties have reduced venture capital funding for OLED lighting companies that would have been common had the OLED lighting "revolution" occurred ten years ago.

Uncertainties about the phasing out of incandescent bulbs: When NanoMarkets began covering OLED lighting markets a few years back, we took it as a given that incandescent lighting would be phased out in all major countries during the 2011 to 2014 period.

We still think this is the most likely scenario. However, in the past year, U.S. consumers and their representatives seem to have become much more aware that an incandescent lighting phase out is planned and have expressed some displeasure at the plans. This may even become a minor issue in the 2012 national elections.

We also note that several Asian nations have general administrative plans to phase out incandescent lighting, but no actual formal regulatory or legal plans. This means that current expectations that incandescent lighting will be quickly phased out in these countries could easily remain unfulfilled. *However, there are uncertainties of a more positive kind too. In Japan, following the earthquake and nuclear disaster, there is considerable talk of special government stimulus funding that might include subsidies for installing LED lighting. While, at the time of writing, this was merely speculation, it is hard to imagine subsidies for LED lighting that excluded OLED lighting.*

Phasing out incandescent bulbs is likely to speed up the OLED lighting market, but in the end all this can do is help the market reach saturation faster. With rapidly declining prices expected in the OLED lighting space, the most likely long-term impact on the OLED lighting market of phasing out incandescent bulbs will be rapid penetration for a few years following the phase out, followed by fairly slow growth for OLED lighting in dollar terms after that.

Regulation in this sense helps the OLED lighting business by bringing revenues earlier than might have otherwise occurred. But it also brings the market saturation point closer too.

1.1.2 The OLED Lighting Industry is in Deep Thought Mode

Some observers of the OLED lighting scene and even some insiders seem to think that absence of news from OLED lighting in the past year is a sign that things are not going so well technically; that performance and size have not been improving to the degree expected.

There may well be some truth to this. However, one reason that NanoMarkets is not too pessimistic about this development is that we have seen this type of pattern in the evolution of a new technology before. It is easier to make progress in a field when one is first starting up in it. We think that OLED lighting has reached a point where the industry is primarily focused on solving technical problems of which there are many. None of these problems seem (to NanoMarkets anyway) to be insurmountable, but they will take time to resolve.

The primary takeaway from all this, is that there is really unlikely to be any great leap forward in penetration of the general illumination market for the next (say) three years until some of the "kinks" in OLED lighting are straightened out. For now the OLED lighting market is entering into a less flashy phase when major manufacturers are focusing on creating higher volume manufacturing facilities—factories that can take OLED lighting beyond the pilot line stage—and on improving the cost/performance ratio for OLED lighting. These are not always easy things to do and tend to focus the collective mind of management more on practical matters than on PR.

Within a few years we would expect OLED lighting to start to grow quite fast as it reaches price points and performance levels that will take it into mass markets. This seems to be the view of many of the OLED lighting firms too, although there are also less charitable views of what is going on in the OLED lighting market and there is some sentiment that OLED lighting will never find sales much beyond the luxury/showroom kind of lighting where it is used now.

In addition to the worldwide economic situation, which is discussed above, the reason for pessimism in the OLED lighting market is usually a sense that OLED lighting will never reach a

point where it can be sold effectively on its high energy efficiency or that it will never reach acceptable price points or that OLED lighting panels will never be large enough to be easily used in office lighting.

Again, NanoMarkets is not so bearish and neither apparently are a lot of large companies. Still, we think it is time to reconsider our forecasting model for OLED lighting in depth, in terms of the current technical state of the art, market structure and price points for OLED lighting.

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Deeper analysis of pricing trends: Our previous pricing analysis has primarily been made on the basis of unit prices, which we still believe is the approach that should be taken, because in the final analysis, OLED lighting panels substitute for existing lighting, which is invariably sold by units, not by the square foot.

However, it seems that at this stage of the evolution of OLED lighting, it is time to make a bigger effort to tie pricing into lumens and square meters shipped. In addition, we have considered more carefully various scenarios for price declines of OLED lighting over the forecasting period being considered.

More consideration of available production capacity: In previous forecasts, we have overwhelmingly focused on demand patterns and likely scenarios for the penetration of OLED lighting of lighting markets more generally. This, of course, tacitly assumed that the production capacity was there to produce enough OLED panels to meet demand.

This seemed (and seems) a plausible enough assumption in that several of the manufacturers active in this space are large electronics firms that have more than enough resources to put extra capacity into place to meet demand, if such demand occurs. *However, in the past year to eighteen months, the OLED manufacturing plans of major manufacturers have become a little clearer (and sometimes a little more conservative) and we are now taking this into consideration in the forecasts we publish for OLED lighting.*

The question of industry leadership: When NanoMarkets first started forecasting the market for OLED lighting several years ago, we had assumed that GE would be a big factor in the evolution of the market and would push the market forward. This view was based specifically on the high profile that the company seemed to be building for itself at the time and on the apparent intention of GE to come to market with a fairly moderately priced OLED lighting panel within a short space of time. However, nothing like this ever happened and we suspect that GE's choice of using a solution processed approach to producing OLED lighting may have run into trouble.

There are certainly other potential leaders in the OLED space. Philips and Osram are the obvious choice and there are plenty of Asian companies that could fill the bill, too. However, what distinguished GE was its apparent early attempt to get the emerging OLED lighting industry into something like mass market mode. No other firm quite promises this.

NanoMarkets thinks that markets like OLED lighting are usually in need of a firm that acts as an advocate for the industry and has the resources to do so effectively. It seems to us that this kind of push has not appeared for the OLED lighting industry and this is yet another reason to give a second look at our forecasts.

1.1.3 A Reevaluation of All OLED Lighting Applications

The bottom line from all of the above is OLED lighting might reasonably now be considered to have matured a bit and some of the earliest (and natural) exuberance has worn off. Firms that were bubbling over with enthusiasm about OLED lighting a few years back are now a bit more circumspect and wiser. This is not necessarily a bad thing and is more likely to lead to industry growth in the long run.

Part of the rethinking process that we describe above is considering exactly what kinds of OLED lighting products will generate revenues in the near-to-medium term and this also means defining OLED lighting product categories more precisely. NanoMarkets' forecasts now reflect these categories more closely. The forecasting categories that we have used in past forecasts, no longer seem adequate for the task. Some no longer seem worth bothering about; OLED backlighting seems the obvious example here. But other categories that were not really a focus of specific attention in the past now seem ready for separate consideration.

By contrast, office lighting has become a key market target for OLED lighting although this market is still some way off. Immediate revenues from the OLED lighting business come from mostly designer kits, luxury lighting, and lighting for show rooms and "prestige" buildings. In NanoMarkets' latest forecast, we have broken out forecasts for these specific categories for the first time.

1.2 Objectives of this Report

With all this in mind, this report provides NanoMarkets' most recent eight-year market forecast for OLED lighting. Our company has been actively tracking the OLED lighting market for more than five years and this report represents a more detailed forecast than any we have ever produced before. However, the main objective of this report has not really changed. As with previous NanoMarkets reports the goal is to provide clear numerical projections of the OLED lighting market over the next eight years.

Our previous forecast of OLED lighting markets was published in May 2011 and this report is intended to update that report in important ways, most of which are set out at the beginning of this chapter:

- As usual we have taken into consideration announcements made by current and prospective players in the OLED space since the last NanoMarkets OLED lighting forecast with regard to pricing, product types and production timetables. These announcements are reviewed critically, since in a few cases, the expectations/projections of some players seem highly unrealistic to us.
- The forecasts in this report are in value and volume (square meter) terms and are broken out by applications. We also consider how the OLED lighting market is likely to be shared among various major countries and regions as it evolves.

Obviously, no one can be completely sure of how the developments in the OLED lighting market will ultimately pan out and with that in mind we consider other prominent forecasts for this market including a worse-case scenario in which OLED lighting never succeeds in growing beyond the luxury lighting sector, along with some ultra-optimistic scenarios that have emerged from apparently respectable sources.

1.3 Methodology and Information Sources

To produce these projections we take into consideration not just what the manufacturers are currently saying, but historical patterns for market evolution in the lighting market, regulatory changes and many other factors. We also discuss likely patterns for the substitution of conventional lighting by OLED lighting; a key factor in any forecast, since OLEDs represent a completely new form of lighting that won't replace existing light bulbs and tubes on a one-to-one basis.

The information used in this report has come primarily from two sources:

- NanoMarkets has derived considerable amount of the background information for this report from its ongoing series of interviews with executives at OLED firms.
- We have also taken some of the information used in this report from trade periodicals, conference presentations, reports and commercial on-line databases that are authoritative with regard to OLED lighting and OLEDs more generally, as well as the lighting industry as a whole. This includes the complete library of our own reports in this field, which is now quite extensive.

1.4 Plan of this Report

In Chapter Two of this report, we have taken a look a look at the future evolution of the OLED lighting market from the demand side both in terms of where and when OLED lighting is likely to find a significant market and in terms of what will likely sell OLED lighting to consumers of both residential and business lighting.

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In Chapter Three we have provided a supply-side analysis of the OLED lighting industry, providing some insight into whether our demand analysis can actually be matched by likely production capacity for OLED lighting panels

Finally, in Chapter Four we provide the core forecast for OLED lighting on an application-by-application basis.