

# Global Optoelectronics Industry Market Report and Forecast

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Optoelectronics Industry Development Association

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## Preface

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The optoelectronics industry continues to be ‘strong and steady,’ underscoring OIDA’s description of the industry in last years summary, ‘*optomism.*’ The following observation is clear from the industry activity over this past year:

*At OIDA, we are now seeing the unanticipated results of three to four decades of research, development, and manufacturing in optoelectronics. In a growing number of cases, the applications of technologies have moved into vastly different markets than those for which they were originally conceived...*

Given that many new applications are consumer based, the sheer volumes of these new opportunities are driving the field to new heights every year. The trend toward convergence is progressing well with products that employ a number of optoelectronic devices that typically would include displays, light emitting diodes (LED), detectors, image sensors, and lasers. One of the big drivers for this convergence is the liquid crystal display (LCD), a key optoelectronics component, which can be now found in a number of consumer products ranging from mobile phones to televisions.

This year’s summary is the most comprehensive worldwide market overview of optoelectronics available to the industry. New for the 9<sup>th</sup> edition, OIDA has extended the traditional trend forecasts to 10 years in many of the covered markets.

In 2006, the optoelectronics market achieved new highs with optoelectronics-enabled and components market reaching \$565 billion in total revenue, a 14.5% increase from \$494 billion in 2005. OIDA forecasts strong and steady growth over the next decade for the optoelectronics-enabled and components markets, with revenue expected to surpass \$1.2 trillion by 2017. This is a 2007-2017 compound annual growth rate (CAGR) of 7.7%. The biggest driver for the growth of this market is LCD displays, which will enable a variety of consumer-based products, from TVs to mobile phones to digital assistants.

Within optoelectronics-enabled products, the growth drivers over the next decade will be solar, computing/processing, and consumer displays/TVs, projected to achieve a 2007-2017 CAGR of 17.3%, 5.6%, and 6.3%, respectively. The forecast for their combined total revenue in 2017 exceeds \$425 billion. In 2006, these three markets achieved revenue of \$198 billion.

The yearly growth for optoelectronics-enabled products and systems in 2006 ranged from 8% to 43%. Growth was led by environment/sensing (43.1%) and medical care/welfare (28.6%). The two biggest revenue segments, consumer display/TV and computing/ processing, demonstrated solid growth of 20.4% and 8.1%, respectively, from 2005 to 2006.

Key findings in this year’s report include:

1. Flat panel display (FPD) revenue will grow to nearly \$200 billion over the next decade, driven predominantly by a-Si thin-film transistor (TFT) liquid crystal displays (LCD) for consumer products such as TVs.

2. White high brightness light emitting diodes (HB LED) will fuel growth of the LED markets to surpass \$14 billion by 2017. The market will be driven by solid-state lighting, automotive, and signs/displays.
3. The laser market is forecast to grow steadily from slightly over \$6 billion in 2006 to nearly double that figure by the end of the next decade. The nondiode market is expected to surpass the diode market in the 2011 timeframe fueled by materials process, industrial, and medical applications.
4. The optical communications market achieved \$19 billion in 2006 and is expected to grow to near \$40 billion by 2017, with a 2007-2017 CAGR of 7%. This growth is led by strong growth in optical networking equipment that evolves the network architecture to be more efficient through the use of dynamic optoelectronic components.
5. Optoelectronic transceivers are expected to grow quickly, from slightly over \$1 billion in revenue in 2006 to over \$6 billion in 2017. Key drivers will be Ethernet/Fibre Channel 10 Gbps technology. Over the next decade, the emergence of 40 Gbps modules will offer new and exciting growth opportunities.
6. Solid-state lighting devices will grow to over 30% of the lighting market by 2017, thereby giving competition to the incumbent incandescent and fluorescent luminaires. The solid-state lighting market is forecast to grow to more than \$60 billion over the next decade and be composed predominantly of HBLEDs. Organic light emitting diodes (OLED) are expected to penetrate this market slowly due to their high cost structure.

Data for this year's summary was collected from OIDA member companies, non-member companies, market research company partners, and members of the International Optoelectronics Associations (IOA). Expanded chapters in this year's report include optoelectronics in wireless consumer products and OLEDs. The report also provides comparisons of decadal forecast data with OITDA in Japan and PIDA in Taiwan.

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## Executive Summary

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In 2006, the optoelectronics market achieved new highs with optoelectronics-enabled and components revenue reaching \$565 billion, a 14.5% increase over 2005 (\$494 billion). OIDA forecasts strong and steady growth over the next decade for the optoelectronics-enabled and components market with revenue expected to surpass \$1.2 trillion by 2017 and a 2007-2017 compound annual growth rates (CAGR) of 7.7%. The biggest driver for the growth of this market is liquid crystal displays (LCD) that will enable a variety of consumer-based products, ranging from TVs to mobile phones to digital assistants.

Within the optoelectronics-enabled products, the growth drivers over the next decade will be solar, computing/processing, and consumer displays/TVs. These markets will achieve a 2007-2017 CAGR of 17.3%, 5.6%, and 6.3% respectively. Their combined total revenue in 2017 is forecast to top \$425 billion. In 2006, these three markets achieved revenue of \$198 billion.

The yearly growth for optoelectronics-enabled products and systems in 2006 ranged from 8 to 43%. Growth was led by environment/sensing (43.1%) and medical care/welfare (28.6%). The two biggest revenue segments, consumer display/TV and computing/processing, demonstrated solid growth in 2006 of 20.4% and 8.1%, respectively, over 2005.

Key findings in this year's report include:

1. Flat panel displays (FPD) revenue is expected to grow to nearly \$200 billion over the next decade, driven predominantly by a-Si thin-film transistor (TFT) liquid crystal displays (LCD) for consumer products such as TVs.
2. White high brightness light emitting diodes (HB LED) will fuel growth of the LED markets to surpass \$14 billion by 2017. The market will be driven by solid-state lighting, automotive, and signs/displays.
3. The laser market is forecast to grow steadily from slightly over \$6 billion in 2006 to nearly double that figure by the end of the next decade. The nondiode market is expected to surpass the diode market in the 2011 timeframe fueled by materials process, industrial, and medical applications.
4. The optical communications market achieved \$19 billion in revenue in 2006 and is expected to near \$40 billion by 2017, with a 2007-2017 CAGR of 7%. This growth is led by strong growth in optical networking equipment that evolves the network architecture to be more efficient through the use of dynamic optoelectronic components.
5. Optoelectronic transceiver revenue is expected to grow quickly from slightly over \$1 billion in 2006 to over \$6 billion in 2017. Key drivers will be Ethernet/Fibre Channel 10 Gbps technology. Over the next decade, the emergence of 40 Gbps modules will offer new exciting growth opportunities.
6. Solid-state lighting devices will grow to over 30% of the lighting market by 2017, thereby giving competition to the incumbent incandescent and fluorescent luminaires. The solid-state lighting market is forecast to grow to over \$60 billion over the next

decade and will be composed predominantly of HBLEDs. Organic light emitting diodes (LED) are expected to penetrate this market slowly due to their high cost structure.

Optoelectronics is quickly penetrating a number of products across many markets, with a trend toward convergence. Optoelectronics technologies are utilized in products that span the communications, computing, consumer, and entertainment markets, to name a few. A significant enabler driving convergence is the LCD flat panel display, which is today found not only in notebook personal computers (PC), but also in televisions, mobile cellular phones, personal digital assistants (PDA), and desktop monitors.

A number of specific types of applications particularly dependent upon optoelectronics have strong potential for market growth in 2007. These include the Internet and computing, cellular telephony, wireline telecommunications, and emerging applications such as games, healthcare, automotive, and sensors.

In summary, the optoelectronics market in 2006 was again strong and steady, with almost all categories, applications, and technologies demonstrating solid revenue progress over 2005. It is expected that a similar performance in the market will continue in 2007 and continue consistently over the next decade.