Laser sources market: technologies, applications and trends

After a challenging year in 2024, the laser market rebounded significantly in 2025.

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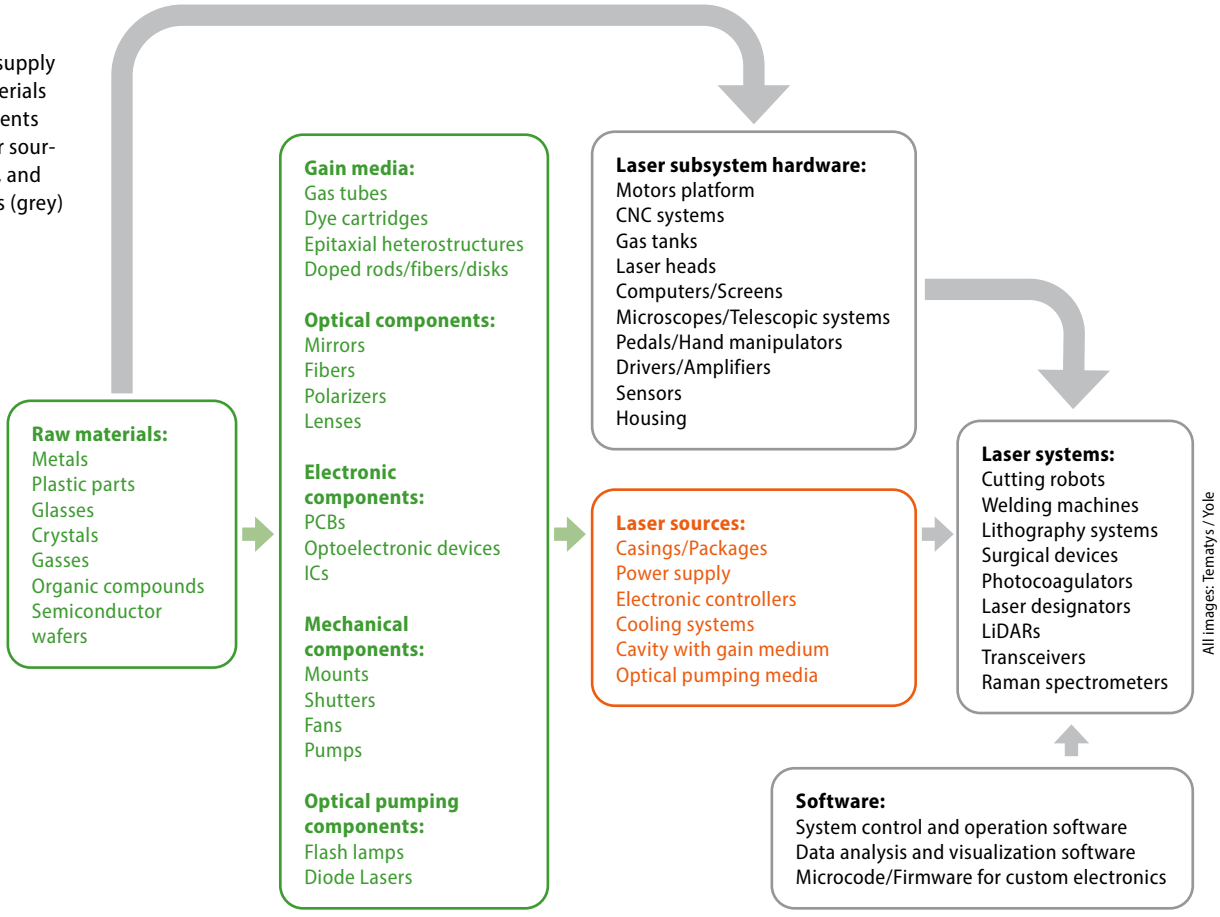

Fig. 1 The supply chain of materials and components (green), laser sources (orange), and laser systems (grey)

This article highlights the main findings of a recently published report on the laser sources market by Tematys and Yole. In 2024, the market declined over 2 % at 14.5 billion US-dollars, impacted by lower average selling prices and weak materials processing, while communications and defense grew strongly. Recovery began in 2025 across industry, medical, automotive, and datacom applications with growth in almost all segments and an average year-over-year increase of near 10 %.

The "Global Market of Lasers 2026" report [1], published by Tematys and Yole, delivers a comprehensive analysis of laser sources across all their application segments. It examines both revenues and unit shipments, with detailed breakdowns by applications and laser technologies. The study also provides insights into market trends, along with forecasts for more than 50 segments (**Table 1**) over the 2024 – 2030 period. This report is built on long-standing expertise and a database covering nearly five-hundred laser companies monitored over several years. The data is validated through interviews with industry experts and laser manufacturers to ensure accuracy in both market figures and trends. In this article, Tematys' analysts highlight the key takeaways from the report.

Trends in global lasers market

Global instability increased in 2024 due to the Middle East crisis, the war in Ukraine along with other conflicts. Ongoing tensions continued to strain supply chains and affect the production and demand of goods. Despite uncertainty caused by macroeconomic factors, many industrial sectors recorded significant growth during the year. The laser industry, however, did not perform as well as other sectors in 2024. Its global market value declined by more than 2 % compared with the previous year. This decline was partly due to seasonal changes in demand across different applications, but mainly to the continued decrease in average selling prices (ASPs). The weakest results came from materials processing applications, and the overall industrial laser market slowed by more than 8 %. In contrast, weaker demand in materials processing was offset by growth in lasers used for communications, sensing, and defense-related applications. In 2025, the laser market showed clear signs of recovery, with strong demand across several applications, especially industrial ones, while the year-over-year (YoY) decrease in ASPs remained relatively low.

Lasers for industry

The main industrial applications of lasers include kilowatt (kW) and subkilowatt (sub-kW) materials processing, marking and engraving, and photolithography. These four segments had a combined share of more than 53 % of the global laser market.

Kilowatts materials processing concerns heavy industrial applications of continuous-wave (cw) CO_2, fiber, disk, and direct diode lasers with output powers of 1 kW and above. The two main applications in this segment are high-power cutting and welding of thick metal sheets. These two subsegments account for 50 % and 46 % of the segment, respectively. The highest demand for welding lasers comes from the automotive industry, particularly for battery manufacturing in hybrid and electric vehicles, as well as for other metal components.

Regarding high-power laser cutting, 2024 was a challenging year, especially for laser manufacturers in Europe and the US, as industrial demand did not grow significantly compared to the previous year. On the other hand, this segment experienced rapid growth in Asia, particularly in China. According to leading Chinese companies, more than 90 % of their revenue was generated from domestic sales. With a market share of 4 %, the high-power additive manufacturing and cladding subsegments represent only a small portion of the kW materials processing segment. The production of reliable components that are subjected to high mechanical and thermal stresses remains a challenge. This factor, combined with increased operational costs, makes traditional manufacturing methods more attractive.

The market size for low and medium-power materials processing lasers saw a slight decline in 2023 and 2024, due to decreasing ASPs of fiber lasers and lower sales of disk lasers. The overall weak performance of the sub-kW materials processing segment was par-

Applications \ Technologies	CO_2 Lasers	Excimer Lasers	Fiber Lasers	LPSSLs	DPSSLs	Disk Lasers	Diode Lasers	VCSELs	Other
kW materials processing	●	●	●			●	●		
sub-kW materials processing	●	●	●	●	●	●	●	●	●
Marking and engraving	●	●	●		●		●		
Photolithography	●	●					●		
Communications			●				●	●	
Sensing and Instrumentation	●	●	●	●	●	●	●	●	●
Automotive and Mobility								●	
Mobile and Consumer applications								●	
Other Professional and Consumer applications						●	●		
Optical pumping							●		
Medicine and Cosmetics	●	●	●	●	●	●	●		●
Military and Defense			●	●	●		●		●
R&D	●	●	●	●	●	●	●		●

Table 1 The industry of laser sources broken down by technology and its respective application segments

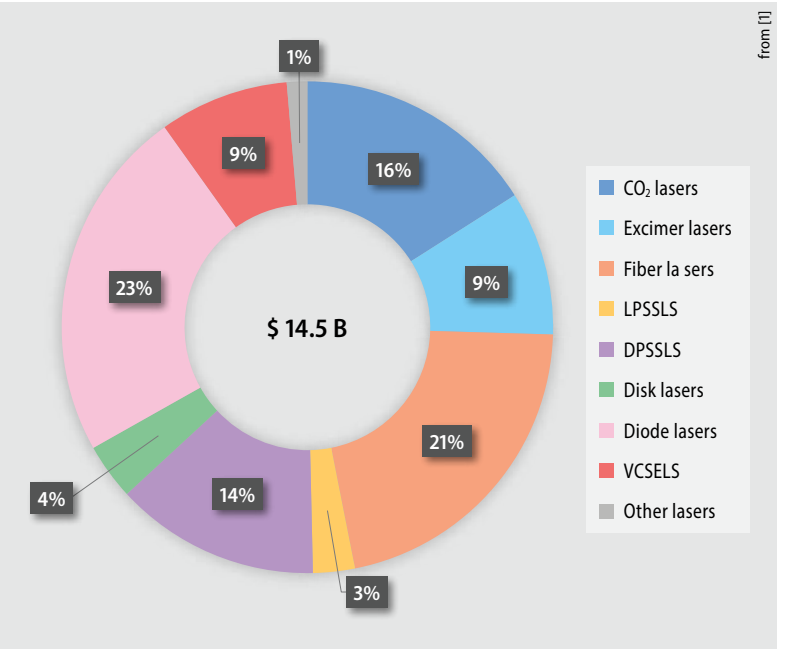

Fig. 2 The global market of laser sources for 2024 segmented by technologies

tially offset by strong demand for ultrafast diode-pumped solid-state lasers (DPSSLs) and fiber lasers used in processing materials and components for electronic device manufacturing. Ultrafast lasers account for about a quarter of the total sub-kW materials processing market, and the main driver of future growth is expected to be increasing demand from the semiconductor industry.

The photolithography segment includes excimer and CO_2 lasers, which are the primary light sources used in DUV and EUV systems. Although the global leader in photolithography systems reported revenue growth in 2024, the total number of units sold worldwide decreased by more than 15 %. This decline negatively impacted the excimer and CO_2 laser market for photolithography, as their ASPs remained largely unchanged in 2024. While laser source prices remained stable, the prices of photolithography systems increased in 2024 and 2025. As a result, the photolithography market size experienced strong growth despite the continued decline in the number of systems sold between 2024 and 2025.

Lasers for optical communications

Lasers for optical communications delivered an outstanding ~40 % YoY growth in 2024, lifted by the rapid buildout of datacenters and a surge in optical transceiver demand mostly tied to AI infrastructure.

The market is being propelled by (1) escalating bandwidth needs for AI training/inference clusters, cloud services, UHD video, etc., (2) a strong push for lower power-per-bit and higher port density, and (3) faster optical lanes and tighter integration. Vendors are racing to scale EMLs, VCSELs, and DFB architectures while accelerating silicon photonics adoption for higher levels of integration. Co-packaged optics (CPO) is bringing optical engines/transceivers in the same package – or very close to the same substrate – as the switch/ASIC and has become a key architectural response to power, reach, and bandwidth-density constraints at the rack and cluster level.

In telecom and network infrastructure, laser demand is supported by steady upgrades in metro/regional transport (including coherent pluggables), continued fiber densification, and capacity expansion to keep pace with IP traffic growth from cloud, automation, and streaming. The emphasis here is on high reliability, long service life, and performance across temperature and reach, which sustains strong pull for DFB/EML-based sources across DWDM/coherent and access applications. As operators expand fiber capacity, lasers that enable higher line rates with improved power efficiency become increasingly central to meeting cost-per-bit targets.

Datacom is now clearly the growth driver, fueled by high-capacity switching and AI cluster structures rapidly migrating to 800G and 1.6T optics. This shift is driving laser technology toward 200G/lambda (and beyond), with focus on low power, manufacturability, and cost effectiveness. Solutions span advanced EMLs, short-reach VCSELs, and high-performance cw DFB sources, increasingly paired with silicon photonics for scalable integration.

While telecom and datacom laser revenues have been broadly comparable in recent years, the mix is expected to tilt sharply: datacom is projected to reach about 80 % of revenue by 2030 (and > 85 % of units), reflecting the sheer scale of datacenter deployments and AI-driven cycles. Continued investment in photonics-enabled transceivers – illustrated by new datacenter photonics initiatives involving STMicroelectronics and Amazon Web Services – reinforces the expectation that optical interconnect demand will remain structurally strong. Overall, the lasers for communications mar-

ket is projected to grow at around 18 % CAGR in the period 2025 – 2030, with the largest incremental growth concentrated in datacom as lane speeds climb and architectures move toward higher integration and co-packaging.

Lasers for medicine and cosmetics

After stable performance in 2022 and 2023, the global market for lasers in medicine and cosmetics declined by 6.4 % in 2024. This decrease was mainly driven by lower demand, a reduction in the number of units sold, and falling prices, particularly for diode lasers in aesthetic procedures. Despite this temporary contraction, the fundamentals of the market remain solid, supported by the continued shift toward minimally invasive treatments and ongoing technological innovation.

Lasers play an increasingly important role in modern medicine due to their ability to deliver high precision while minimizing blood loss, tissue damage, and infection risks. In surgery, laser incisions are often more precise than conventional scalpels and can seal blood vessels as they cut, reducing bleeding, swelling, and scarring. CO_2 lasers are widely used for surgical applications because the heat they generate helps sterilize tissue while promoting faster healing. Er:YAG and Ho:YAG solid-state lasers are also employed in general surgery for cutting and sectioning tissue, including in minimally invasive and endoscopic procedures.

Ophthalmology remains one of the most advanced and established applications of laser technology. Excimer and femtosecond lasers are essential components of refractive surgery systems used in lasik procedures and certain cataract operations. Femtosecond lasers enable extremely precise corneal cuts with minimal thermal damage and are combined with excimer lasers for corneal reshaping. Growing demand for vision correction procedures continues to support this segment of the market.

In dermatology and aesthetic medicine, lasers have become widely used tools. Picosecond lasers are used for tattoo removal, while diode lasers dominate applications such as hair removal and skin rejuvenation due to their compact design, reliability, and affordability. Additional treatments include wrinkle reduction, vascular lesion therapy, acne scar treatment, and pigmentation correction. Emerging applications target chronic skin conditions such as psoriasis and vitiligo. Dermatology and cosmetic operations remains the largest segment to revenue (about 45 %) in the medical laser market, driven by increasing consumer demand for noninvasive cosmetic procedures worldwide.

Dental applications are also expanding, with lasers being used for cavity removal, gum reshaping, and teeth whitening. Their precision reduces patient discomfort and improves treatment outcomes.

Beyond traditional uses, innovative approaches such as photodynamic therapy combine laser light with light-sensitive compounds to selectively destroy cancer cells, offering an alternative or complementary option to conventional oncology treatments.

Looking ahead, the market for lasers in medicine and cosmetics is expected to return to solid growth between 2025 and 2030, with a CAGR of nearly 6 %. This expansion will be primarily fueled by rising global demand for aesthetic treatments, declining prices of diode lasers that make procedures more accessible, and continued growth in ophthalmic surgeries. Additional momentum is expected from advances in femtosecond and excimer laser systems, as well as broader adoption in surgery, dentistry, and vascular applications.

Lasers for automotive, mobile & consumer products

The automotive lidar market continues to grow, particularly in China, as OEMs are integrating this technology across a broad range of ve-

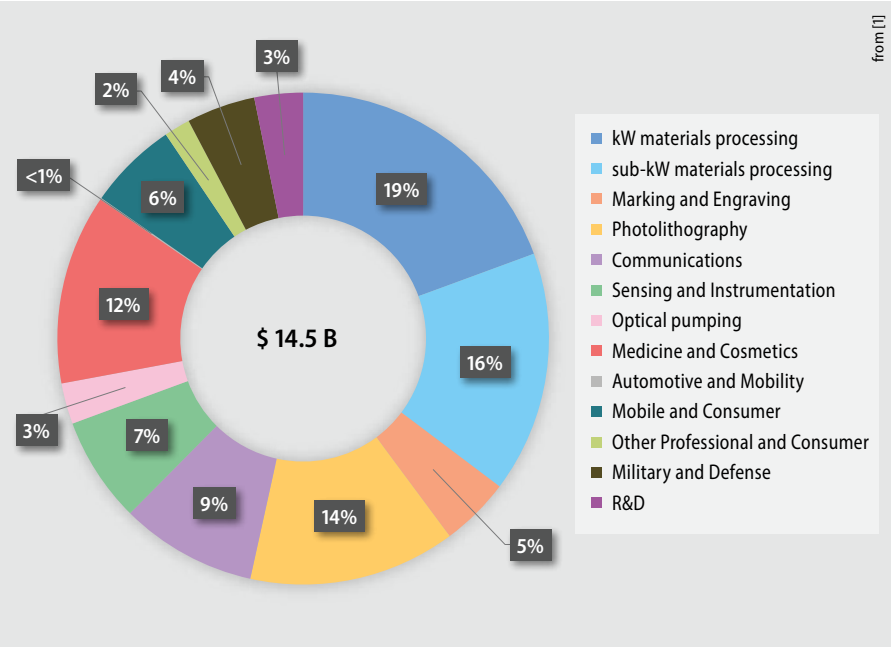

Fig. 3 The global market of laser sources for 2024 segmented by applications

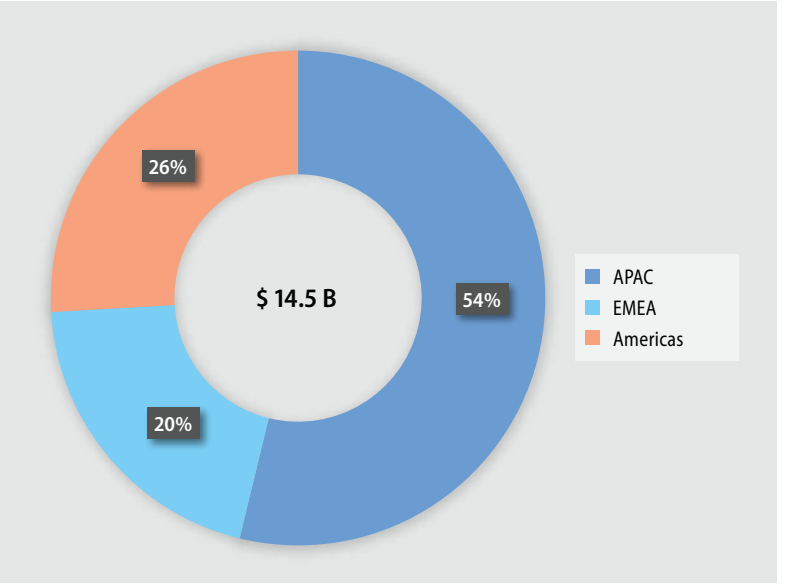

Fig. 4 The global market of laser sources for 2024 by geographical region

hicle types, from high-end to more affordable models. In contrast, car manufacturers in the US and Europe have adopted lidar at a slower pace, limiting its use primarily to luxury product lines. However, this trend is about to change, as governments and safety agencies worldwide are pushing for mandatory ADAS features, which will increase demand for sensor technologies, including lidar. Regulatory guidelines from agencies such as Euro NCAP are encouraging automakers to incorporate robust sensing systems into new vehicle models.

In the VCSEL market, the largest application segment is mobile and consumer products, where nearly 85 % and 10 % of sales revenue come from 3D sensing and optical sensing. In this subsegment, VCSELs are used for 3D sensing in mobile devices, wearables, smart home systems, and proximity sensors.

Although the diode laser market for optical storage has experienced a continuous decline in recent years, the introduction and rapid commercialization of heat-assisted magnetic recording (HAMR) hard drives are expected to drive a rebound in this segment.

Lasers for defense and R&D

SSLs and diode lasers have many applications in defense, including telemetry, target designation and smart munitions guidance, and small-arms target marking. Due to their excellent emission properties across a broad range of wavelengths in the FIR, quantum cascade lasers (QCLs) are widely used in infrared countermeasure systems, where a beam targets the IR heat-seeking system of an incoming missile, disrupting its ability to reacquire and track the aircraft's heat signature.

Almost immediately after their discovery, lasers were considered for use in weapons systems. Currently, high-power fiber lasers with multi-kW output powers equip directed energy weapons for the interception of airborne threats such as artillery shells, drones, and cruise missiles.

The defense laser market grew by 5 % in 2023 and 2024, which comes as no surprise given the escalation of global tensions over the past five years. This period of instability has prompted many countries to strengthen or upgrade their arsenals. Photonic technologies, including lasers, are core components of advanced military equipment, and the defense laser market is expected to grow rapidly in the coming years.

The three sectors expected to contribute to the growth of the R&D market segment during the period 2025 – 2030 are inertial confinement fusion, photonic quantum technologies, and fundamental research in biology and medicine aimed at improving diagnostics and developing novel treatments.

Conclusion

The global market of lasers faced multiple challenges during 2024 due to fluctuations in demand for different applications, the drop of ASPs but also due to macroeconomic factors that affected the supply chain. In 2025, the market showed signs of strong recovery with a year-over-year growth of close to 10 % This trend is expected to continue in the following years, and the growth of the global lasers market will be driven by the high demand from the manufacturing industry, communications and defense.

Reference

[1] Global Market of Lasers 2026, Tematys and Yole, 2026, www.tematys.fr/reports/11-all-reports

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