# Converting Every Hot Spot Into a Performance Accelerator

## Proven Cooling for Transceivers and Co-Packaged Optics in AI Data Centers

**As data centers race to support next-generation AI, the need for high-bandwidth, low-latency interconnects has never been greater. Phononic's solutions are engineered to meet these challenges head-on, delivering best-in-class performance, quality, and reliability at scale—combining hyperscale-ready expertise with precision thermal control.**
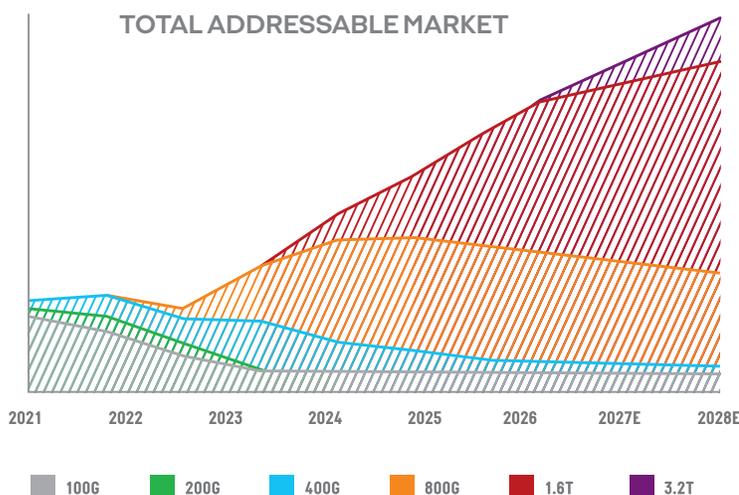
AI workloads are driving a fundamental shift in back-end network design, requiring higher lane rates, longer reach, and more wavelengths per fiber—all while meeting strict power budgets to maintain PUE targets. These demands push optical components to their limits, making advanced thermal management essential for performance and efficiency.

The doubling of modulation with next-generation optics and the growing need for 2 km ("FR") reach put additional pressure on EML performance specifications. Modulating to encode twice the data increases temperature sensitivity through chirp, making wavelength stability critical. The right thermoelectric cooler (TEC) ensures precise EML temperature control—reducing bit error rate, maintaining low latency, and minimizing module power consumption.

The standard approach to 800G (2×400G FR4) pluggables uses CWDM4, combining multiple wavelengths onto a single fiber. Longer reach compared to DR optics amplifies chromatic dispersion, making wavelength stability crucial. Phononic's proven design process delivers TECs with the fastest response time and tightest temperature stability, locking in wavelength for these strict requirements.

Co-Packaged Optics (CPO) is reshaping network architecture by integrating optics and switching in a single package. The result: lower power, higher bandwidth density, and reduced latency. AI deployments that take advantage of CPO will need mission critical precise and high quality cooling. Phononic's unmatched design expertise delivers leading cooling solutions through thermal kits for CPO, and becomes even more mission-critical as CPO adoption expands.

Phononic's expertise is built on proven innovation with solutions deployed in all major hyperscalers today. Our proprietary modeling and design process, combined with ISO-certified quality and global manufacturing, ensures rapid development, and supply chain resilience. Whether your back-end network prioritizes longer reach, higher lane rates, or both, Phononic TECs are custom-engineered to scale optical performance with precision and reliability—empowering the AI-driven future.

**TOTAL ADDRESSABLE MARKET**



2021  2022  2023  2024  2025  2026  2027E  2028E

■ 100G  ■ 200G  ■ 400G  ■ 800G  ■ 1.6T  ■ 3.2T

**Source:** *Goldman Sachs Global Investment Research, Light Counting, Analysis*

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# Phononic TECs are the Ideal Solution for High Performance & Efficiency

Phononic's application-specific approach to TEC design, along with the hundreds of reference designs we've developed over the past decade, presents the ideal solution for cooling lasers used in high-speed optical components. Phononic offers cost-effective solutions for multichannel laser packages through powerful TECs that deliver best-in-class power consumption to achieve high yield and low cost. Our client partners have already seen this benefit in action — Phononic TECs can currently be found in 40M+ devices across the globe. Plus, our powerful manufacturing partnership with Fabrinet, combined with our strong portfolio of global distribution partners, ensures you get the TECs you require on a timetable that matches your own manufacturing schedule. With application-specific TECs by Phononic, you'll see a lower cost per lane and a significant drop in power consumption, boosting your ROI while consistently meeting your customers' needs.

At Phononic, we believe cooling shouldn't be a constraint, it should be a catalyst. We're building the thermal foundation for the next era of compute; smarter, faster and ready to scale.

## Powerful Partnerships for Full-Scale Manufacturing & Distribution

Phononic has a deep understanding of the optoelectronic market's past, present and future. We pay close attention to the trends and technology driving optoelectronics forward. In doing so, it quickly became clear that there would soon be explosive demand for high-powered transceivers — and the need for advanced TECs to optimize them. We were going to need trusted, high-volume manufacturing partners closer to our clients to meet this forecasted demand. That's why, in 2020, Phononic partnered with Fabrinet, a leading provider of advanced optical packaging and precision optical, electro-mechanical and electronic manufacturing services. This partnership swiftly demonstrated its purpose: In record time, we were fully qualified with customers as we scaled global production of high-performance thermoelectrics, all without disrupting our supply chain.

And to ensure regional and global supply meets the growing demands of the optical transceiver market, Phononic has brokered partnerships with distributors like Photonteck (China), Seikoh Giken (Japan), and El-Gev Electronics Ltd (Israel).

## Consistent Delivery of Dependable, High-Quality and Proven Technology

At Phononic, we have imposed some of the most rigorous standards in the market upon ourselves, and we continuously invest in top-of-the-line methods to deliver the highest quality and reliability to maintain our status as an industry leader, and The International Organization for Standardization (ISO) has noticed. The ISO provides the world's most widely recognized certifications for Quality Management Systems (QMS) and Environmental Management Systems (EMS), and Phononic has earned certifications toward ISO 9001:2015 and 14001:2015 standard requirements.

In addition, Phononic's copy-exact process between NPI and full-scale production avoids surprises, re-work or lost time, helping our customers ensure efficient speed to market. Phononic further sets itself apart from others through our 100% in-line testing for key quality and performance metrics, a key way our team works to ensure the highest quality and performance for our customers, every time. By leveraging our proprietary TEC technology and scalable device architecture, we are uniquely positioned to reliably deliver high performance cooling that meets the most rigorous demands, regardless the sector.

**Learn more:**