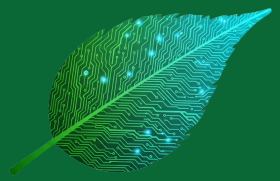
Sustainability



Microchips power everything—from smartphones to satellites—but making them is resource-intensive and environmentally challenging. **Futur-IC** is a global collaboration, including MIT and leading photonics researchers, focused on creating sustainable chip manufacturing and packaging. The goal? Reduce energy use, cut waste, and design processes that are kinder to the planet. This project explores advanced materials, photonic integration, and innovative packaging techniques to make chips smaller, faster, and greener. Why is this important? As demand for electronics grows, so does the environmental footprint of production. **Futur-IC** aims to break that cycle by introducing eco-friendly solutions without compromising performance. These innovations could transform industries, enabling devices that are both powerful and sustainable.

Futur-IC isn't just about technology—it's about responsibility, ensuring that the next generation of electronics supports a healthier planet while driving progress in computing, communication, and beyond.

Why Light-Based Technologies Are Greener

Light-based (photonic) technologies use photons instead of electrons to transmit and process information. This fundamental shift dramatically reduces energy consumption as photons travel without resistance, unlike electrical currents that generate heat and waste energy. Lower heat means less cooling is required, cutting power demands in data centers and devices. Manufacturing photonic components often uses fewer raw materials and supports miniaturisation, which lowers resource use and waste. In applications like sensing and imaging, photonics can deliver higher precision with less power, making medical devices and communication systems more sustainable. By replacing copper wires and bulky electronics with optical fibers and chips, photonics helps reduce carbon footprints across industries. Simply put, light-based technologies combine speed, efficiency, and sustainability—powering a cleaner future for computing, healthcare, and global connectivity.