

Sustainability Through Intelligence

arm

OUR BUSINESS MODEL

- + Arm licenses processor designs and intellectual property (IP) to semiconductor designers and other technology companies, which then use our IP as a foundation for their own products.
- + The IP business accelerates innovation and fosters greater economic opportunity by distributing product development tasks across an ecosystem.
- + Our customers and partners range from Fortune 50 companies to startups, university incubators, and government agencies.

CPUs and digital technologies will play a pivotal role in reducing carbon, increasing energy efficiency and fostering a sustainable future.

Digital technology is one of humanity's most potent tools in the fight against climate change. Some experts have estimated that computing and communications could help reduce worldwide emissions **by up to 15 percent by 2030** by fine-tuning energy consumption for consumers and businesses and by replacing energy-intensive activities, such as commuting and air travel, with more efficient ones like videoconferencing. Digital technology can also curb the unnecessary loss of water, food, embedded energy, and other resources.

While consumers and businesses in mature economies will see the difference, the impact in emerging economies will be far more profound with these technologies helping to expand access to grid power, stable water and wastewater systems, healthcare, and education.

Arm contributes to this effort by creating computing building blocks—microprocessor designs, security technologies, and software tools—that enable semiconductor designers, equipment manufacturers, and service providers to embed powerful, invisible, and energy-efficient intelligence into data centers, automobiles, consumer devices, industrial equipment, and other systems.

Arm has also committed to achieving net zero carbon by 2030, a commitment that includes cutting absolute emissions from our business operations by at least 42 percent.

Arm at a Glance

+ **180+ Billion**
Arm-based chips shipped by our partners to date

+ **95%**
of the world's smartphones run on Arm processors

+ **90%**
IoT devices run on Arm-based technology

+ **1000+**
partners in our ecosystem

+ **70%**
of the world's population uses Arm-based technology on a regular basis

+ **6500+**
employees worldwide

Arm Helps Achieve Sustainability in Three Ways

1. Arm Helps Reduce the Carbon Footprint of Computing.

PCs, datacenters, cellular networks, and other digital systems consume approximately **10 percent of the world's electricity**. While power consumption has stayed relatively stable, computing's share of electricity could grow, potentially quite rapidly, with the advent of artificial intelligence (AI), IoT, and other new technologies. Without technology advances that allow datacenters and devices to perform these larger and more complex workloads within existing power budgets, the end result could become increased emissions, higher costs, and slowing innovation. Arm has focused on increasing the performance per watt of computing systems for more than 30 years, and believes that the digital economy can continue to thrive with a relentless focus on efficiency.

- ✦ **Datacenters.** Amazon Web Services' Graviton2 Arm-based processors deliver **2-3.5x more performance per watt** than systems running conventional processors. This more efficient computing footprint has allowed customers to increase their workloads while reducing the resources to perform them **by 10 percent to 40 percent**.
- ✦ **IoT.** The Arm Ethos-U55 Neural network processor **provides up to 90 percent energy reduction for machine learning (ML) workloads** for IoT devices. MONO, a chip being developed by Arm in conjunction with DARPA, promises to reduce ML tasks, like voice recognition or computer vision, to milliwatts.
- ✦ **Mobile and Client.** Cortex-A78, Arm's latest processor, increases performance over its predecessor by 20 percent, while keeping within a 1-watt power envelope: consumers can run energy-intensive apps like AR or video efficiently.
- ✦ **Supercomputing.** Fugaku, running Arm-based processors, is the top performing supercomputer in the world and a **leader in energy efficiency**. Sandia National Laboratories, SiPearl (EU), ETRI (Republic of Korea), Stony Brook University, and the University of Bristol also have Arm-based supercomputing projects underway.

2. Arm Helps Reduce the Carbon Footprint of Businesses and Consumers.

- ✦ **Smart Buildings.** Arm collaborates with Fortune 500 companies and **startups** on smart lighting, **smart thermostats, water management, HVAC control,** and other systems to unobtrusively conserve power.
- ✦ **Smart Cities.** The City of Taipei has integrated Arm processors and IoT services from Pelion (an Arm subsidiary) **into over 4,000 streetlights to dynamically adjust lighting power and reduce maintenance**. Arm also participates in the **Sage Project** with Argonne National Laboratories to analyze traffic, air quality and other parameters in real time. Pilots are underway in Chicago, Austin, and elsewhere.
- ✦ **Smart Supply Chains.** Vodafone and Bayer are piloting an Arm-based smart label that monitors temperature and other data to protect vaccines. It can run for up to three years on a single charge. **Triffid**, a future Arm processor that harvests energy from RF frequencies, will perform similar functions to curb food waste and increase recycling.

3. Arm Helps Accelerate Innovation in Renewables.

Arm partners are integrating AI, IoT, and cloud analytics into solar arrays, microgrids, and electric vehicles (EV) to boost efficiency, reduce repair costs, and lower the cost of renewables.

Smarter Solar. **Enphase Ensemble** lowers the cost of energy storage and provides off-grid power during emergencies by using digital technologies to create localized microgrids. Swift, a processor from Enphase for Ensemble, is based on Arm technology.

Carbon Capture. **Hypergiant**, a Texas-based firm, hopes to capture CO₂ with algae bioreactors meticulously controlled by Arm processors.

Smart Meters. **Kepeco**, South Korea's largest electric utility, is deploying an energy management platform encompassing 30 million smart meters and one billion sensors with Arm processors and Pelion IoT services.

For more information, go to www.arm.com

