High-Performance Computing Hardware

ANMD-MRS24-233 · Quantum & Advanced Computing

A Global Sustainability Due Diligence & Market Research Study

History 2020–2024 · Base Year 2025 · Forecast 2025–2032 · Outlooks 2035 / 2040 / 2050 · Currency US$

WHY THIS REPORT

High-performance computing (HPC) hardware is the engine room of AI, scientific simulation and data analytics — dense clusters of CPUs, GPUs and accelerators wired with high-bandwidth interconnect and cooled by increasingly liquid and immersion systems. As AI training pushes power and thermal limits, the market pivots on compute density, energy efficiency and cooling architecture. This decision-grade study sizes the global market three ways — value, systems and compute capacity (FLOPS) — across segmentation, seven regions and four scenarios to 2032, with outlooks to 2050.

SUSTAINABILITY & SDG IMPACT — THE ANMD LENS

The sustainability case is the report's backbone. HPC hardware is an energy- and water-intensive asset whose footprint can be transformed by liquid cooling, heat reuse and renewable-powered, carbon-aware operation. The analysis applies double materiality, maps outcomes to GRI, SASB, ISSB, TCFD, TNFD, CSRD and the EU Taxonomy, and Embodied carbon in servers, e-waste circularity, water use and grid impact are treated as material risks — with greenwashing and SDG-washing screens applied throughout.

Mapped Sustainable Development Goals:

SDG 9	SDG 13	SDG 7
Industry & Infrastructure	Climate Action	Affordable & Clean Energy

Measurable sustainability outcomes assessed:

- Accelerating AI, science and climate modelling
- Higher compute efficiency per watt
- Enabling data-driven decarbonisation
- Energy and water use and e-waste as material risks

Framework alignment: Double materiality mapped to GRI, SASB, ISSB, TCFD, TNFD, CSRD and the EU Taxonomy, with greenwashing and SDG-washing screens applied throughout.

WHAT'S INSIDE AT A GLANCE

53 Chapters	**9** Report Parts	**7** Regions Covered	**40+** Country Markets
2025–32 Forecast Horizon	**4** Forward Scenarios	**25+** Companies Profiled	**3** SDGs Mapped

REPORT COVERAGE

Geographic scope: North America, Europe, Asia Pacific, Latin America, Africa, Middle East and Rest of World — with named country intelligence. North America leads HPC and accelerator design; Europe drives sovereign supercomputing; Asia Pacific scales deployment; other regions on their own merits.

MARKET OVERVIEW

From CPU clusters to accelerator-dense, AI-scale HPC hardware.

HPC hardware is in an AI-driven super-cycle. Demand is driven by frontier-model training, sovereign-AI compute, scientific simulation and the energy-efficiency imperative as data-centre power becomes a binding constraint. The market is read three ways — value, systems and compute capacity (FLOPS) — and forecast under four scenarios (conservative, base, accelerated and disruption), each region reported separately.

- **North America dominates supply** — anchored by the United States, where NVIDIA, HPE/Cray, Dell, AMD, Intel and Supermicro concentrate accelerator and system leadership.
- **Europe builds sovereign HPC** — with France, the UK and Germany advancing Atos/Eviden and EuroHPC exascale deployments.
- **Asia Pacific scales fast** — as China and Japan combine Lenovo, Inspur, Fujitsu and NEC with large national supercomputing budgets.
- **Architecture and cooling segment the value** — across CPU, GPU/accelerator and hybrid systems and air-cooled, direct-liquid and immersion cooling.

REGIONAL OUTLOOK

Across seven reporting regions, the report separates commercialisation and supply leaders from high-growth and emerging markets — each profiled in full rather than aggregated into Rest of World.

Region	Stage	Lead Markets & Drivers
Europe	Strong contender	France, UK, Germany — Atos/Eviden, EuroHPC exascale
North America	Market leader	United States, Canada — NVIDIA, HPE/Cray, Dell, AMD, Supermicro
Asia Pacific	Scale engine	China, Japan — Lenovo, Inspur, Fujitsu, NEC, national budgets
Latin America	Emerging	Brazil, Chile — research computing, energy-sector HPC
Africa	Frontier	South Africa, Egypt — research clusters, capacity building
Middle East	Frontier	Saudi Arabia, UAE — sovereign-AI compute, sustainable cooling

KEY MARKET DRIVERS & RESTRAINTS

Drivers	Restraints
• AI training & inference compute super-cycle	• Data-centre power & grid-capacity limits
• Sovereign-AI & national supercomputing programmes	• Accelerator supply constraints & lead times
• Scientific simulation & research demand	• Capital intensity & rapid obsolescence
• Accelerator & interconnect performance gains	• Cooling-retrofit & facility complexity
• Liquid / immersion cooling efficiency push	• Export controls on advanced chips

SEGMENTATION SNAPSHOT

By Architecture	CPU cluster · GPU / accelerator · hybrid
By Cooling	Air-cooled · direct liquid · immersion
By Component	Compute node · interconnect · storage · cooling system
By Application	Air-cooled · direct-liquid · immersion deployments
By End User	Hyperscalers · research labs · enterprises · government / defence
By Deployment	On-premise · colocation · cloud HPC

TABLE OF CONTENTS — PARTS & CHAPTERS

The full report is organised into nine parts across 53 chapters, listed below. Detailed sub-headings, country tables and directories are provided in the full report.

COMPETITIVE & INVESTMENT SNAPSHOT

The competitive field spans accelerator leaders, system integrators and cooling specialists.

Representative players profiled in the full report:

NVIDIA Corporation · Hewlett Packard Enterprise Company (Cray) · Dell Technologies Inc. · Advanced Micro Devices, Inc. · Intel Corporation · and 20+ further profiled players across HPC, accelerator and systems innovators.

Investment intelligence: venture, infrastructure, development, climate and blended finance, green bonds and sustainability-linked loans — culminating in a bankability assessment and a clear, decision-ready investment verdict.

KEY QUESTIONS THIS REPORT ANSWERS

? How large is the global high-performance computing hardware market, and how fast will it grow to 2032?
? Which regions, countries and segments offer the strongest risk-adjusted opportunity?
? How does accelerator density change compute value versus general-purpose clusters?
? Who leads, and where is the competitive and patent white space?
? Is the investment case bankable — and under what conditions?
? How does the category align with the SDGs, circular-economy and resource-security and disclosure regulation?

WHY ANMD — THE DIFFERENCE

Most market studies stop at units and revenue. This report is built as a sustainability due diligence instrument — fusing market sizing with ESG, SDG, climate, water and natural-capital intelligence and a decision-ready bankability verdict in a single architecture.

- **Triangulated sizing** — every market read three ways (value, systems and compute capacity (FLOPS)) so value-led and volume-led views reconcile rather than conflict.
- **Region-honest forecasting** — Latin America, Africa and the Middle East reported in full, never hidden inside Rest of World, every forecast resolved to the 2025 base year.
- **Integrated evidence base** — company, patent and project databases linked to the analysis, with published-filing patents and FTO treated as an indicator, not a legal conclusion.
- **No-fabrication discipline** — every estimate carries a data-confidence rating and disclosed sources; gaps are flagged for further diligence, never filled with invented numbers.
- **Anti-greenwashing rigour** — SDG-washing and greenwashing screens plus claim-substantiation checks built into the ESG and project analysis.
- **Decision-first structure** — 9 Parts and 53 Chapters culminating in stakeholder playbooks and a clear, decision-ready investment verdict.

WHO SHOULD BUY THIS REPORT

Investors and infrastructure / PE funds, hyperscalers and enterprises, HPC OEMs and integrators, national labs and research bodies, lenders and policymakers, and strategic corporate planners and decision-makers.

Access the Full Report

The complete report delivers all 53 chapters in full, with every sub-heading, country table, company and patent directory, forecast model and due diligence checklist.

Purchase at **www.anewmarketdynamics.com** · Standard & Premium licences · Single-Site (SSL) and Global-Site (GSL) options at checkout.

Want the Complete Detailed Table of Contents?

This prospectus lists the nine parts and 53 chapters. The complete detailed table of contents — every sub-heading, country table, exhibit, company and patent directory and annex — is available on request to registered users. To receive it, register with your official company email at **www.anewmarketdynamics.com**. The full detailed table of contents will be sent directly to your registered company email address.