



Deutsche Bank
Chief Investment Office

Long-Term Investment Themes

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Long-term themes, structured around three global forces



A clear investment framework linking resource use, population needs and enabling technologies.

01 RESOURCE TRANSITION



Circular Material
Use



Food system
adaptation



Energy Transition

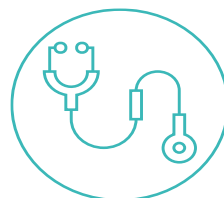


Blue Economy

02 POPULATION SUPPORT



Infrastructure



Healthcare and
MedTech



Consumption
Megatrends

03 NEXT-PHASE TECHNOLOGY



Artificial
Intelligence



Robotics



Smart Mobility



Cyber Security

- We organise our eleven Long Term Investment Themes (LTITs) into three broad areas: **Resource transition**, **Population support** and **Next-phase technology**.
- We see these areas as the most important global challenges in terms of how we properly use and conserve our resources, support the world's population and develop key technologies that can help us in these endeavours.

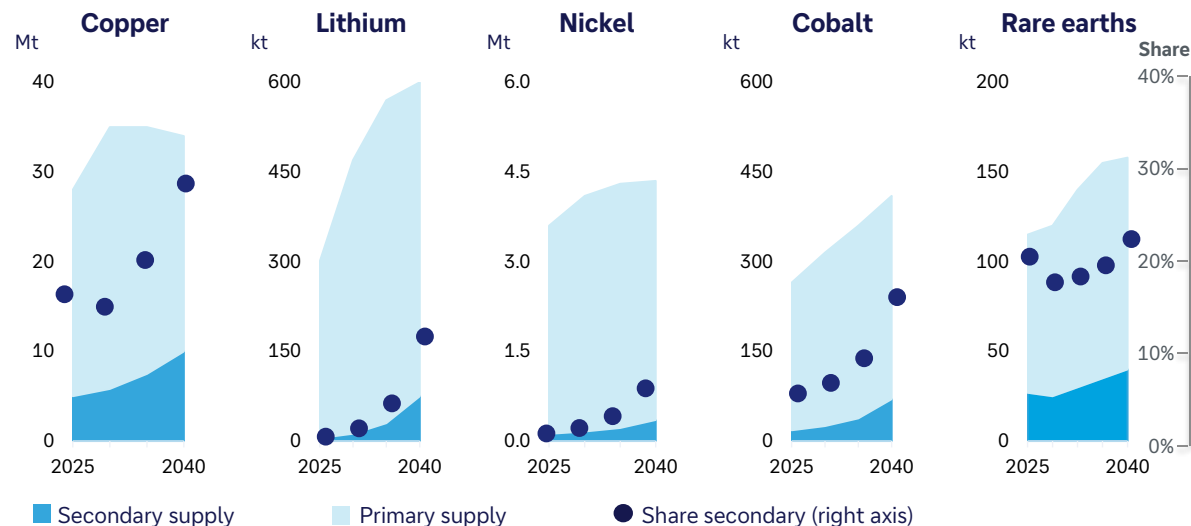
Source: Deutsche Bank AG.



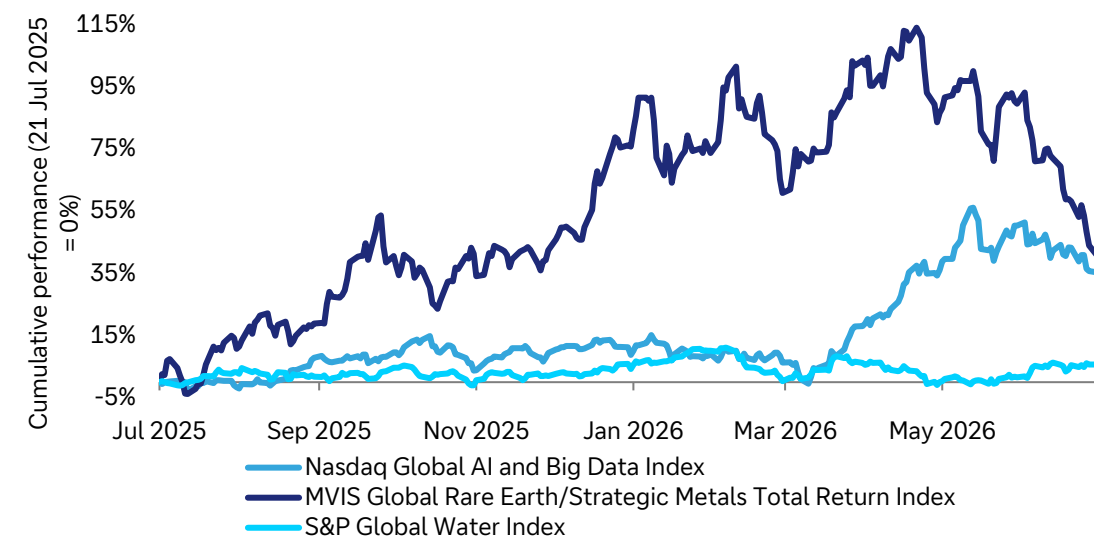
Resource transition



Secondary supply could double its share by 2040



AI growth is driving demand for critical resources



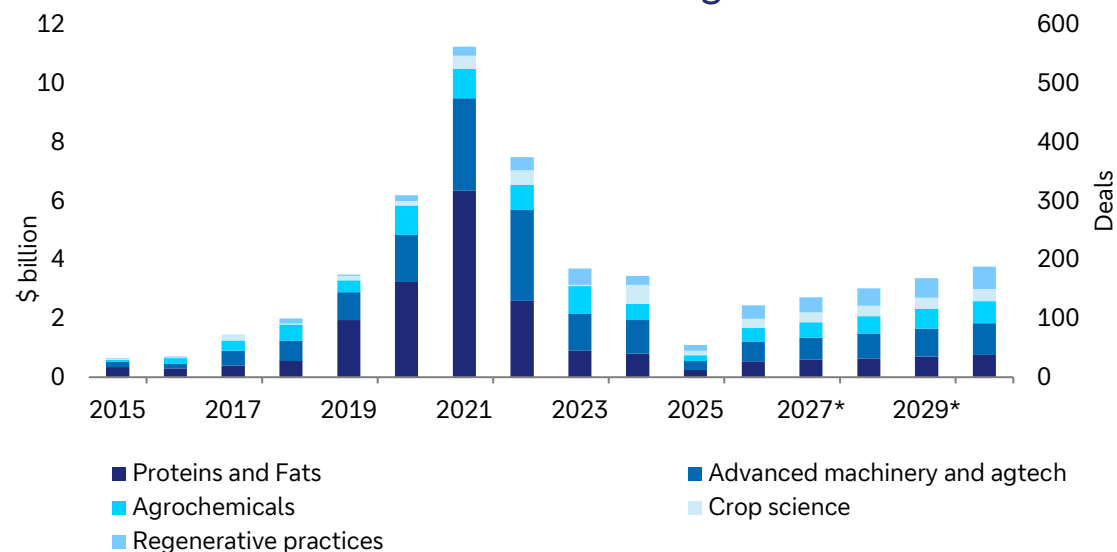
- **AI, defence and digital infrastructure are intensifying competition for critical materials.** Global nickel demand is projected to rise some 26% between 2025 and 2030, while rare-earth demand is being driven by data centres, robotics and defence systems (an F-35 alone requires around 0.4 tonnes of rare-earth permanent magnets).
- **A more fragmented world makes secure supply chains vital.** China supplied some 90% of refined magnet rare earths in 2025, exposing advanced infrastructure and defence systems to trade restrictions and supply bottlenecks. Despite diversification efforts, ex-China NdPr supply is still forecast to fall 36% short of demand by 2030. Countries including the US and those in Europe view this dependency as a risk and are investing in alternative production and sourcing routes.
- **We expect supply-chain resilience to remain a structural investment driver.** Diversification, near-shoring, recycling and substitution are becoming strategic responses as governments and companies seek to reduce dependence on concentrated supply sources. Companies in Materials and selected Industrial segments may benefit from increased demand for critical inputs and a stronger focus on recycling and resource efficiency.
- **This strengthens the long-term investment case for circular solutions.** Recycling could reduce new mining requirements for key minerals by 25–40% by 2050, while recycled materials could expand into a USD200bn market. Water reuse and closed-loop cooling offer another opportunity: 42% of data-centre capacity could be located in highly water-stressed regions by 2030, with water treatment and reuse requiring around EUR 1tn of investment through 2040.

Note: NdPr, or neodymium-praseodymium, is primarily used to produce high-strength permanent magnets. These magnets are key components in electric-vehicle motors, wind turbines, robotics, electronics, AI infrastructure and defence systems because of their compactness, light weight and energy efficiency. Sources: IEA, Global Critical Minerals Outlook 2026; Bloomberg (NYGBIG, MVREMXTR, SPGTAQD). Data as of July 21, 2026.

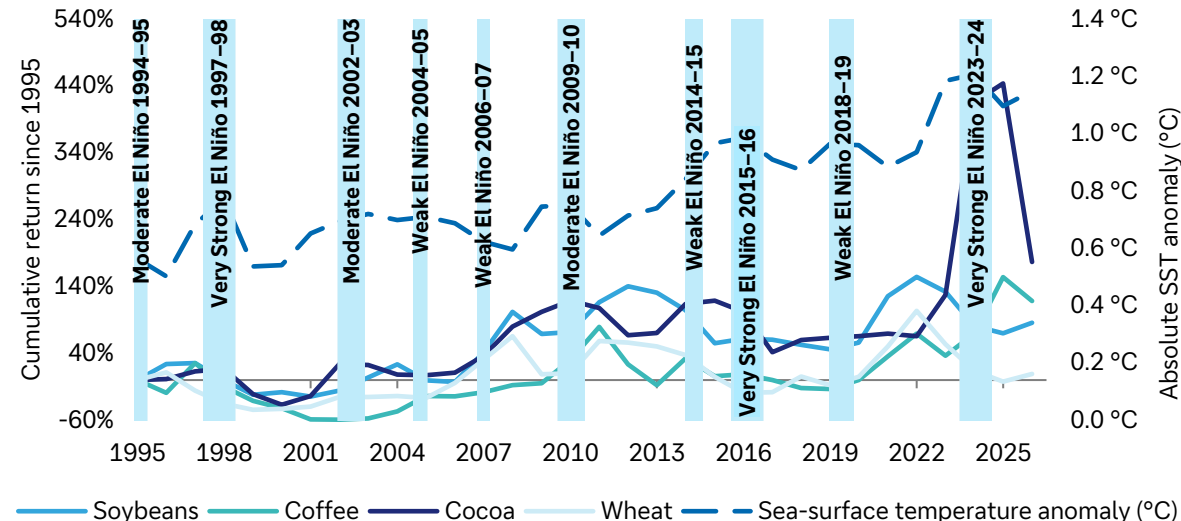
Food system adaptation and resource-efficiency opportunities



VC and PE investment in food and agriculture



Climate-driven supply shocks & agricultural commodity returns



- **Food markets are being reshaped by climate risk, geopolitics and shifting trade links.** Population growth and rising incomes in emerging markets could increase demand for animal-source foods by around 80% by 2050, while fertiliser, energy and logistics disruptions are contributing to greater food-price volatility. At the same time, extreme weather events are increasingly affecting crop yields, water availability and supply-chain resilience.
- **Brazil is gaining share from the US as agricultural trade flows shift south.** China purchased 51% of US soybean exports in 2024 but only 29% in January–August 2025. Over the same period, China absorbed 76% of Brazilian soybean exports, highlighting how geopolitics, trade policy and cost competitiveness are reshaping supply chains.
- **Food-production technologies addressing resource efficiency, climate adaptation and supply-chain resilience.** The combination of rising food demand, climate adaptation requirements and the need for more resilient supply chains is driving investment across precision agriculture, regenerative farming, biological crop inputs, alternative proteins, agricultural robotics and AI-enabled farm management.
- **The scale of the opportunity is substantial.** The FAO estimates that global food demand could rise by around 50% by 2050. This creates long-term opportunities across agritech, biological crop inputs, water management, agricultural robotics and food biotechnology. Regions such as North America, Europe, Latin America and parts of Asia are likely to be key centres of innovation and investment.

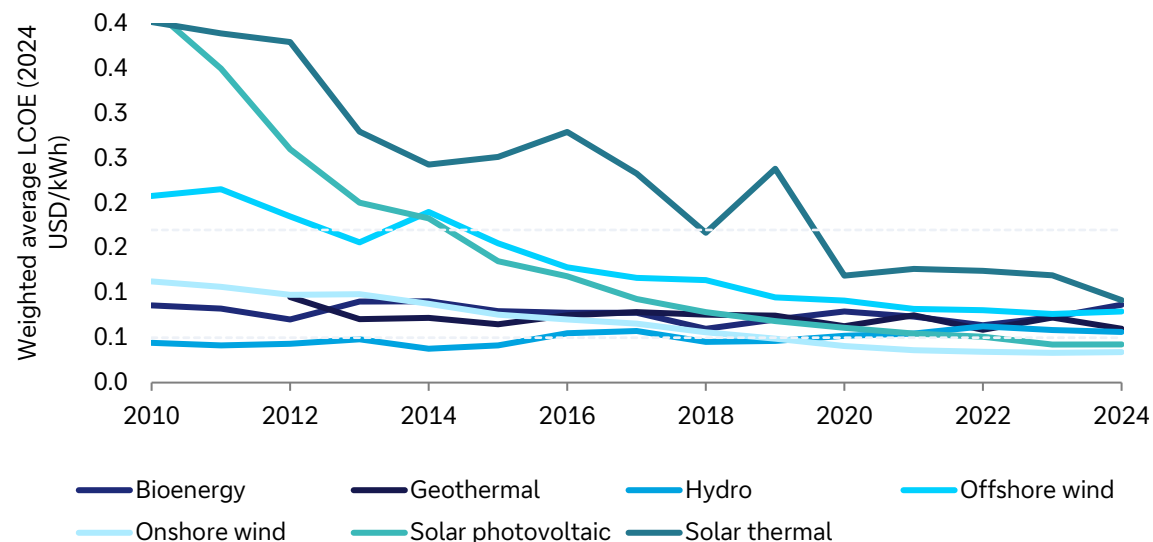
Note: FAO refers to the Food and Agriculture Organization of the United Nations.

Sources: BloombergNEF, CBInsights; PitchBook; World Bank Group; IFC; FAO; OECD; EIB; UNCTAD; World Economic Forum.

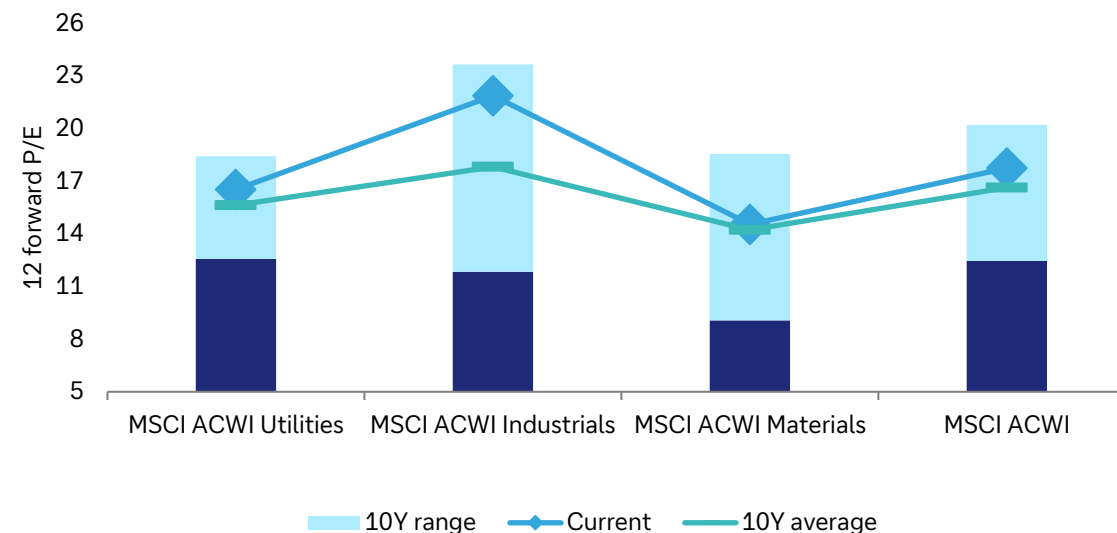
Energy Transition & Electrification



Low-carbon energy technologies are now a cost-competitive alternative



Electrification beneficiaries & stronger structural growth

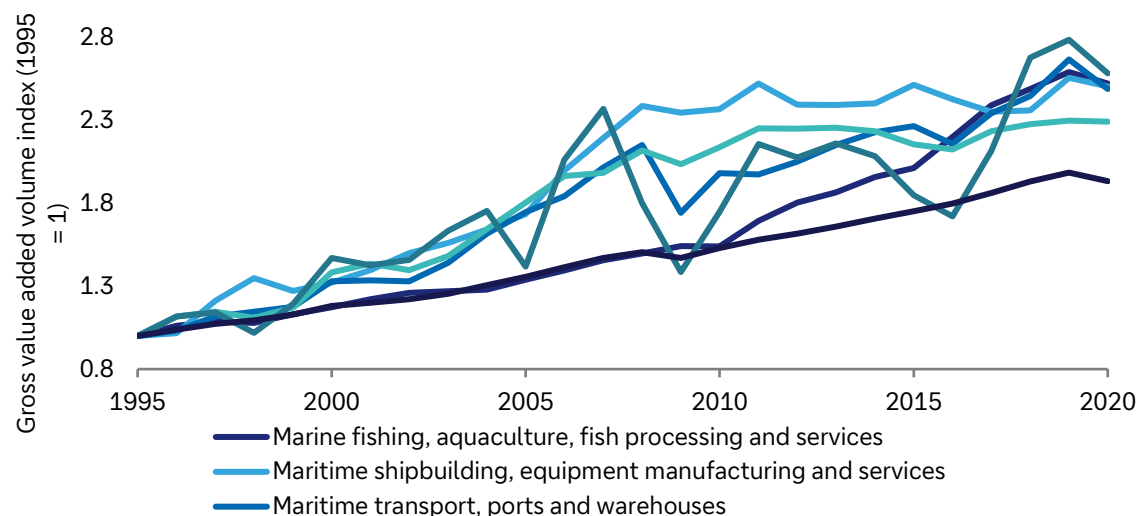


- **Electrification is expected to play a growing role in future energy systems.** Global energy investment was estimated at USD3.3tn in 2025, with roughly two-thirds directed towards renewable and low-carbon energy technologies. For investors, the theme is shifting from environmental exposure towards energy security, infrastructure resilience and electricity value-chain growth.
- **Grid infrastructure is the main bottleneck, and therefore a key opportunity.** Electricity demand is expected to grow around 2.5x faster than overall energy demand through 2030, while grid investment needs to rise by 50% by 2030. Ageing networks, rising load volatility and renewables integration support long-duration demand for utilities, grid equipment, cabling, transformers, automation and digital-grid solutions.
- **AI strengthens the narrative, but broader electrification remains the secular driver.** Data centres could approach c.945 TWh of electricity demand by 2030 under aggressive scenarios, yet the largest demand pool remains transport, buildings, heating, cooling and industry. This favours diversified exposure across power generation, networks, storage and demand-side technologies rather than a narrow AI-power trade.
- **Investors should think in systems, not sectors.** The opportunity spans utilities, industrials and materials, with clean generation, storage, flexibility, critical minerals, electric mobility and grid modernisation increasingly repriced around energy security and resilience. Selectivity remains important given supply-chain, permitting and financing constraints.

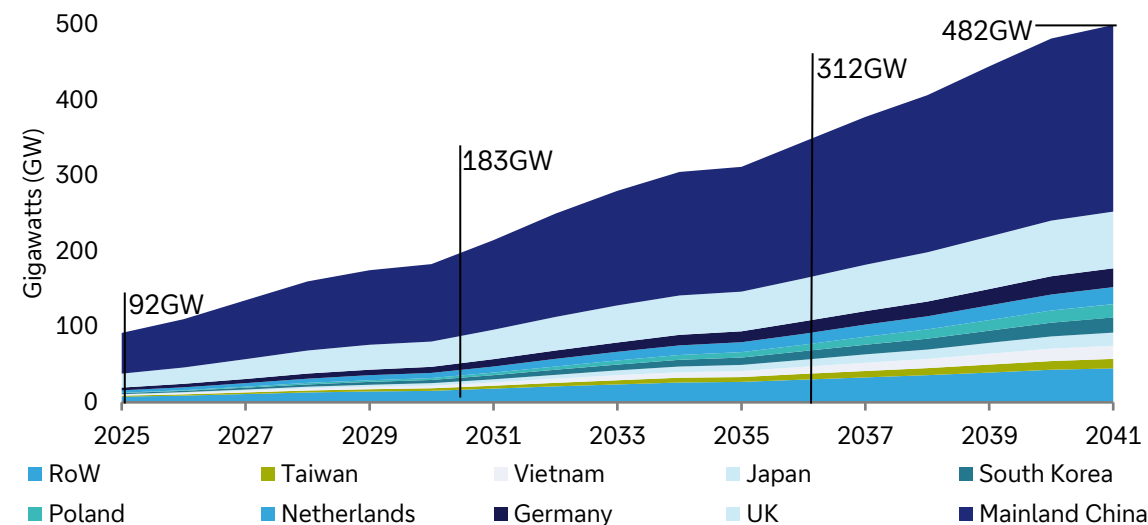
Source: IRENA, LSEG Datastream, Deutsche Bank AG. Data as of May 29, 2026.



Ocean has outpaced the global economy since 1995



Outlook for cumulative offshore wind installations



- **The blue economy is becoming a more investable transition theme as capital follows infrastructure, trade and resilience needs.** Deal activity and average deal values have risen since 2018, with investor interest broadening across blue renewable energy, water management, ocean monitoring, shipping and ports.
- **Ocean renewables remain one of the clearest long-term investment pillars, despite recent project-level headwinds.** Offshore wind benefits from published emissions-reduction targets, lower generation costs and policy support, while floating wind and grid-related infrastructure could expand the opportunity set. However, supply-chain bottlenecks, financing costs, grid constraints and equipment recycling remain key execution risks.
- **Lower-emission shipping technologies are gaining importance as emissions regulation and fleet renewal drive investment.** With ships carrying around 80% of global trade volume and 60% of trade value, opportunities span cleaner fuels, vessel upgrades and port infrastructure.
- **Selectivity remains essential because bankability varies significantly across the blue economy.** Scalable technologies with clear revenue models, supportive regulation and environmental outcomes that can be objectively measured appear better positioned, while smaller restoration, conservation and pollution projects may still need blended finance or specialist structures to overcome size, maturity and liquidity constraints.

Note: Gross value added volume index, 1995 = 1. Ocean economy categories and rest of economy shown in volume terms.
Source: OECD (2024); BloombergNEF; Deutsche Bank AG.



Population support

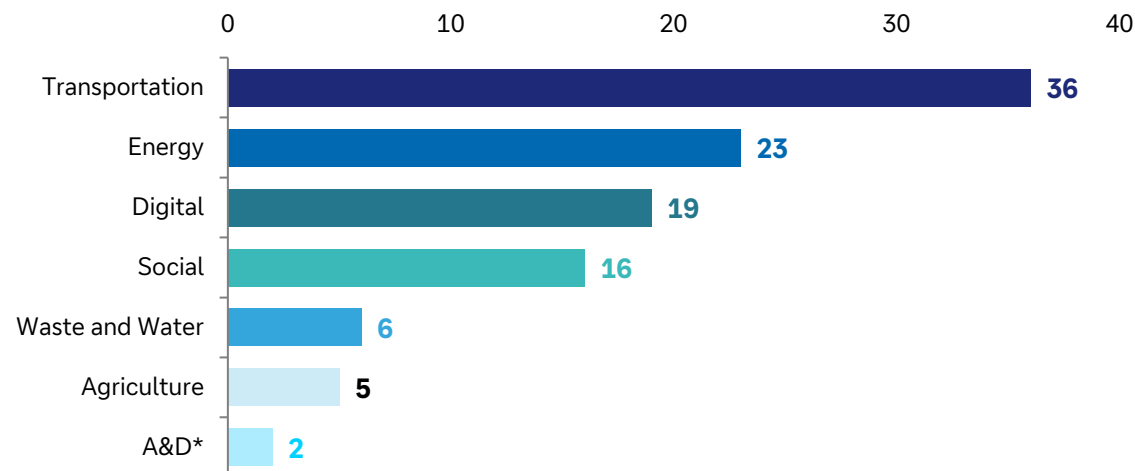


Infrastructure – At the crossroads of many opportunities



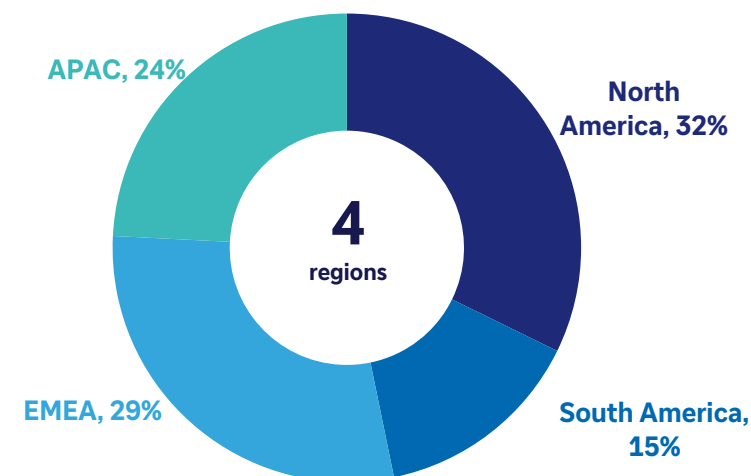
Cumulative investments could exceed USD100tn by 2040

Total infrastructure investment projected through 2040, by sector, USD trillion



The infrastructure supercycle is global in nature

New infrastructure projects by region between January-April 2026, %-share



- **Infrastructure is entering a multi-decade investment supercycle, with cumulative global investment needs expected to exceed USD100tn by 2040.** The definition of infrastructure is also expanding beyond transport assets toward energy systems, digital networks and strategic industrial capacity.
- **Digitalisation and AI are expanding the infrastructure universe**, driving demand not only for data centres and fibre networks, but also for power generation, transmission grids, storage and cooling systems needed to support rising electricity consumption.
- **Energy security and electrification are reshaping capital allocation**, supporting investment across power networks, renewable integration, storage solutions and the **critical infrastructure required to improve resilience and reliability**.
- **Geopolitical fragmentation** is increasing the need for strategic infrastructure, including logistics networks, industrial capacity and supply chains designed to enhance economic competitiveness and resilience.
- **The opportunity set extends well beyond traditional utilities and transport assets, spanning digital infrastructure, energy systems, critical materials and selected private-market investments supported by long-term structural demand trends.**

*Aerospace & Defence.

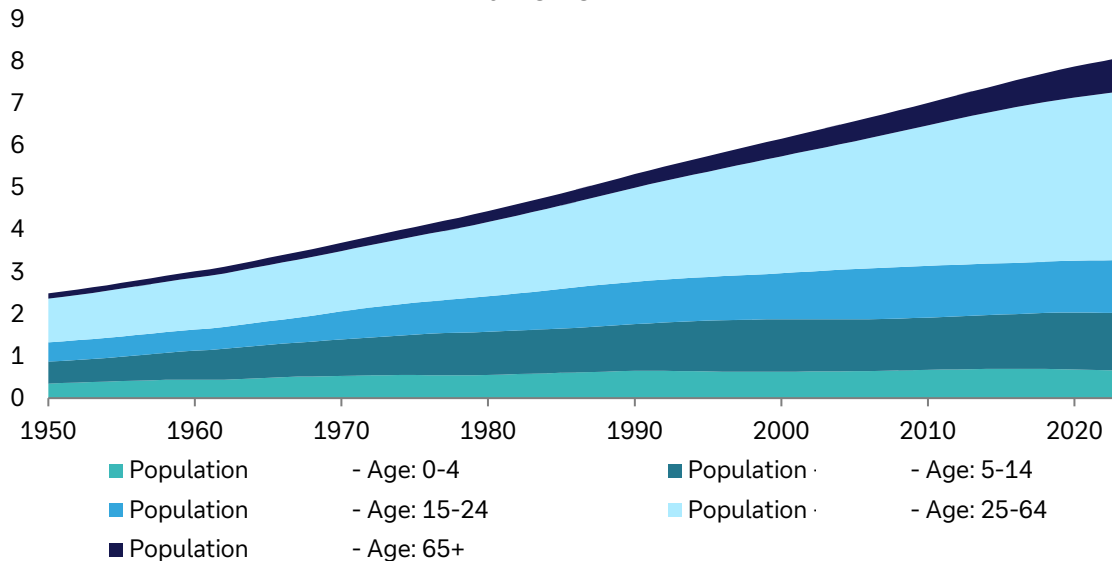
Sources: McKinsey; LSEG Workspace; Deutsche Bank AG. Date as of July 2026.

Healthcare – Innovation meets demographic tailwinds



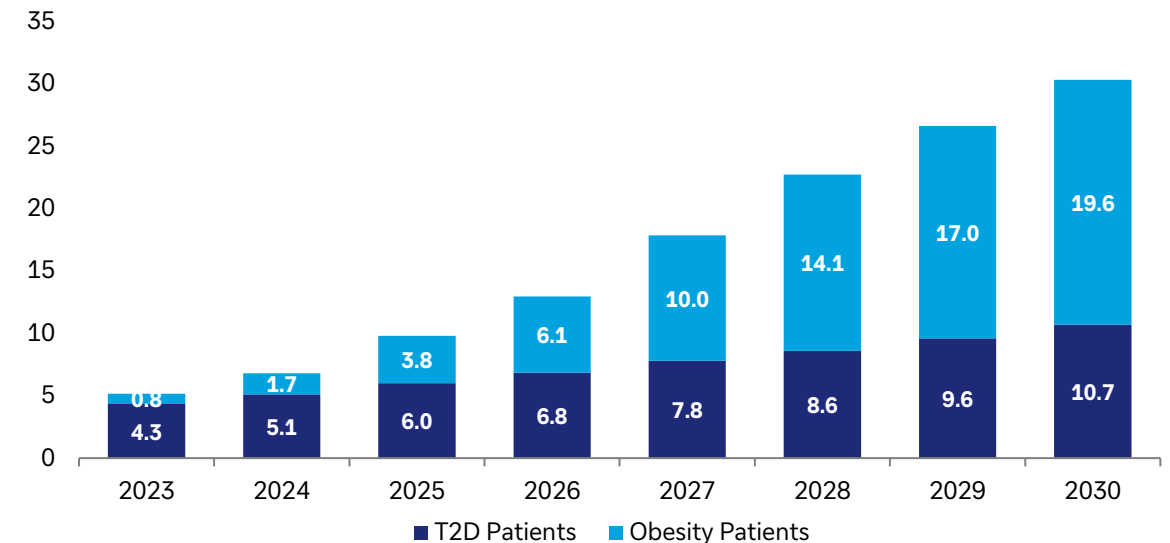
Ageing populations are a long-term driver of healthcare demand

Global population composition by age group, billion



GLP-1 therapies are creating a new healthcare growth market

US patients prescribed with GLP-1s , million



- **Population ageing and rising healthcare spending remain powerful long-term drivers, supporting demand for pharmaceuticals, medical services and healthcare technologies.**
- **The obesity market is emerging as one of the largest opportunities in healthcare,** with new therapies expanding beyond weight loss into diabetes, cardiovascular and other metabolic conditions.
- **Artificial intelligence is reshaping healthcare delivery and drug discovery,** helping improve diagnostics, accelerate research and enable more personalised treatment pathways.
- **Biotechnology** and precision medicine continue to drive innovation, supported by advances in **mRNA technologies, targeted therapies and data-driven healthcare solutions.**

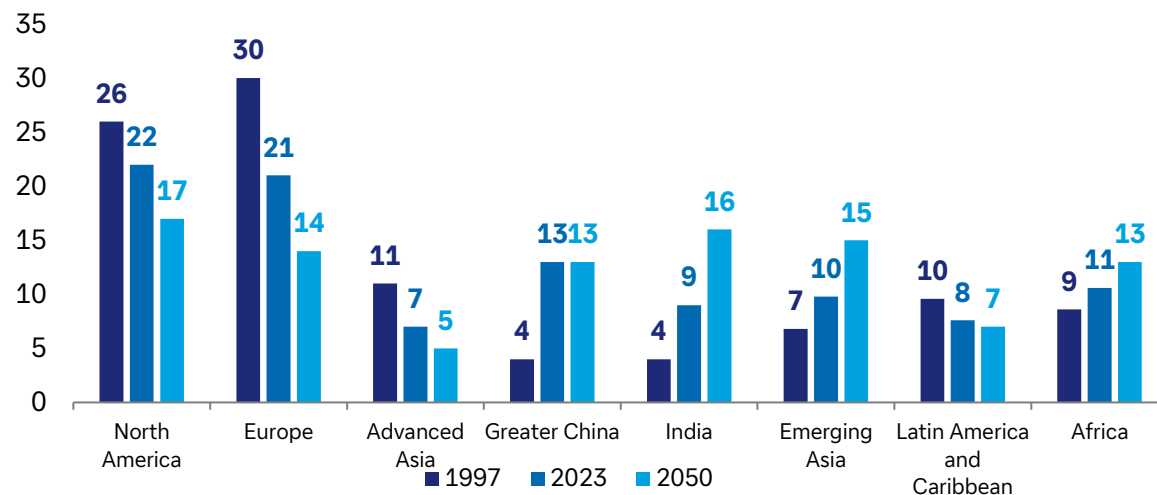
Source: OurWorldinData, IQVIA, Deutsche Bank AG. Data as of July 2026.

Consumption Megatrends

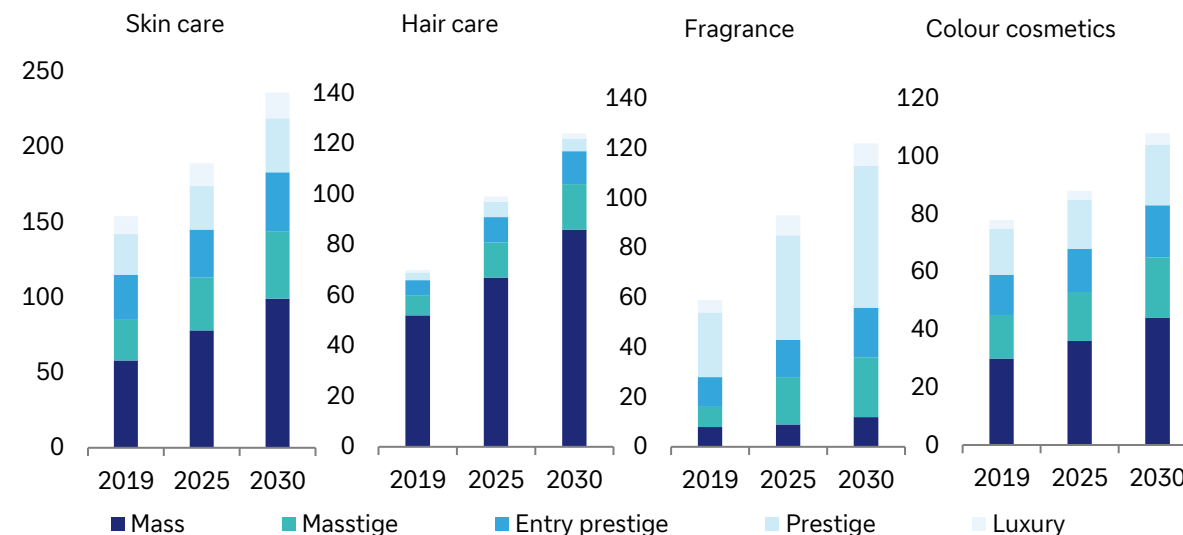


Consumption pools are shifting to Emerging Asia and India

Regional contribution to global consumption, %, 1997-2050



Beauty markets' growth projected to concentrate in different price tiers



- **The geography of global consumption is changing, with India and Emerging Asia expected to account for an increasing share of future consumer spending as rising incomes, urbanisation and expanding middle classes reshape demand patterns.**
- **Premiumisation remains a powerful spending trend**, as consumers increasingly allocate spending towards products that combine quality, personalisation and perceived value, particularly in beauty, wellness and lifestyle categories.
- **Beauty and personal care continue to demonstrate resilience across economic cycles, supported by self-care, wellness and aspirational consumption trends.** Skin care remains the largest category globally, while fragrances have been among the fastest-growing segments in recent years.
- **Digital and social commerce** are increasingly influencing purchasing decisions, accelerating product discovery, brand engagement and premium-category growth, particularly among younger consumers and in emerging markets.

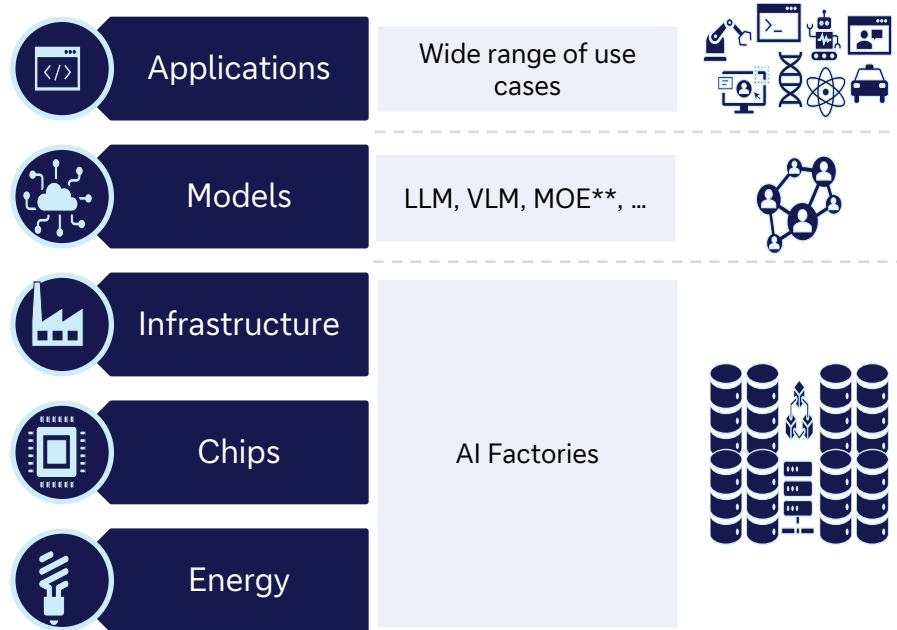
Source: McKinsey, Deutsche Bank AG. Data as of July 2026.



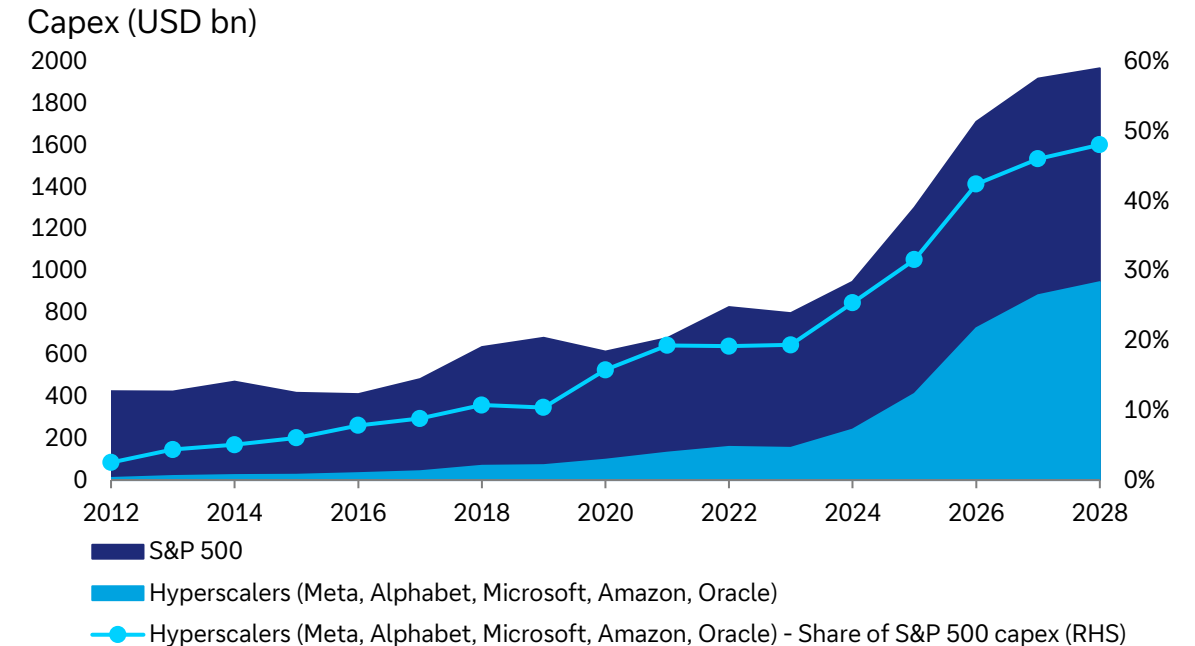
Next-phase technology



The AI value chain as a five-layer cake



Hyperscaler capex approaching a trillion USD



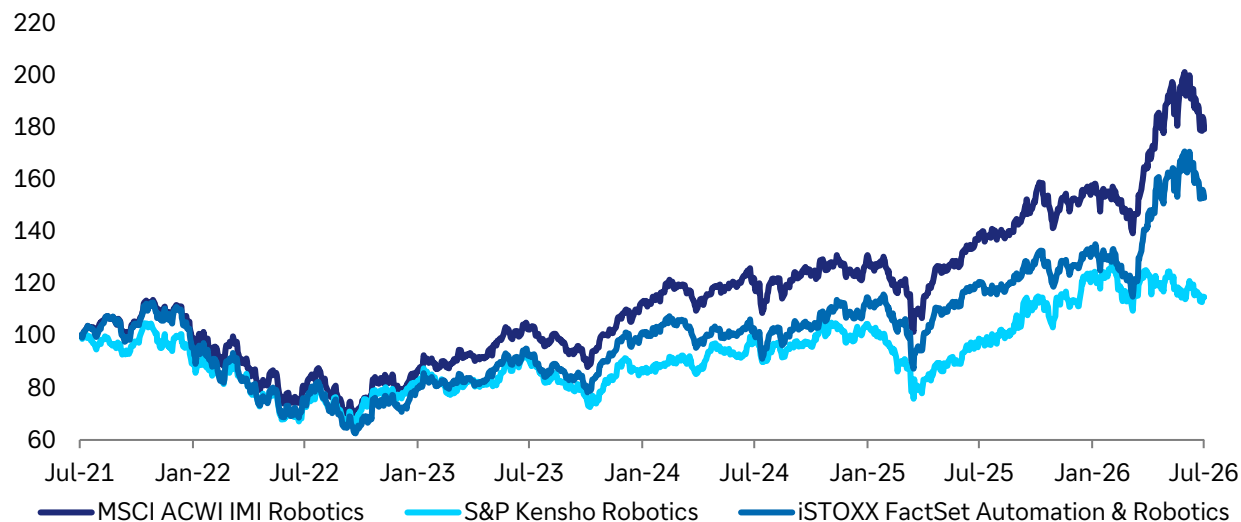
- Rising hyperscaler investment, with data-centre capital expenditure estimated at around **USD900bn in 2026**, continues to support demand across **advanced semiconductors, high-speed networking, data centres, cloud infrastructure, electricity generation and cooling systems**.
- As the market shifts from infrastructure build-out towards commercialisation, investors increasingly favour companies that can demonstrate **revenue growth, margin expansion, productivity gains and stronger free cash flow**.
- Beyond the initial semiconductor beneficiaries, market leadership could broaden towards **cloud platforms, enterprise software, agentic AI applications and companies applying AI successfully across traditional industries**.
- Across asset classes, the AI investment cycle is supporting **economic growth, power demand, strategic materials, infrastructure financing and capital-markets activity**, although elevated valuations and uncertain returns require careful selection.

Sources: Nvidia, Deutsche Bank AG, Data as of July 2026; LSEG Datastream, Deutsche Bank AG, Data as of July 27, 2026.



Robotics stocks capturing the physical layer of the AI boom

Total return (Indexed: -5Y=100)

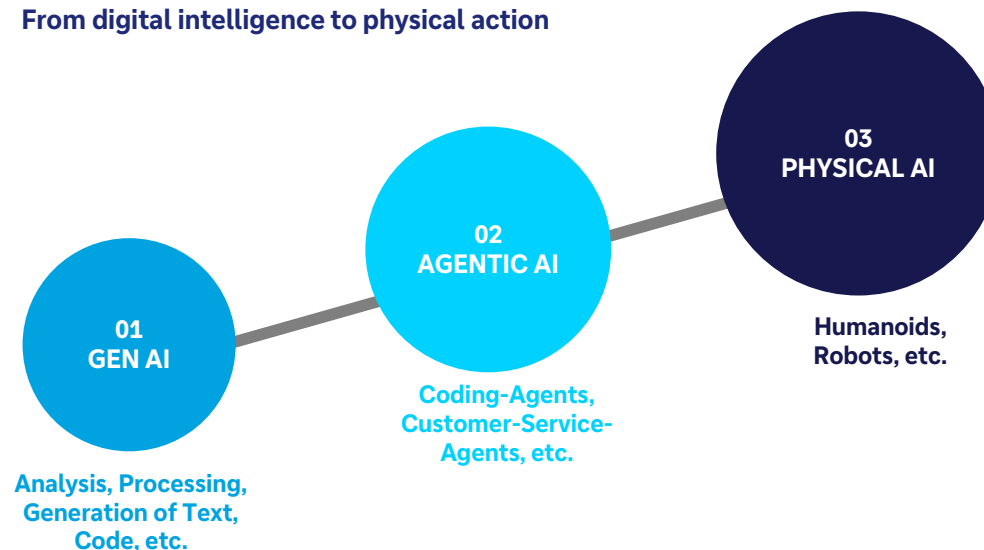


- As AI moves from software into the physical world, robotics is emerging as the next stage of adoption, expanding opportunities across **industrial automation, autonomous machines, sensors, machine vision, motion control and advanced semiconductors**.
- The integration of generative and agentic AI is making robots **more adaptable, autonomous and capable of operating in less structured environments**, potentially broadening demand beyond factories into logistics, healthcare, agriculture, construction and consumer applications.
- With longer-term forecasts ranging from **several hundred million to more than 1 billion humanoids by 2050**, embodied AI could significantly expand demand across **robot manufacturers, component suppliers, industrial software providers and automation adopters**.
- Across markets, robotics offers exposure to **labour scarcity, reshoring, supply-chain resilience and rising capital intensity**, although long commercialisation timelines, high hardware costs, technological obsolescence and elevated expectations require careful selection.

Source: LSEG Datastream, Nvidia, Deutsche Bank AG. Data as of July 2026.

AI is becoming increasingly embodied in robotics

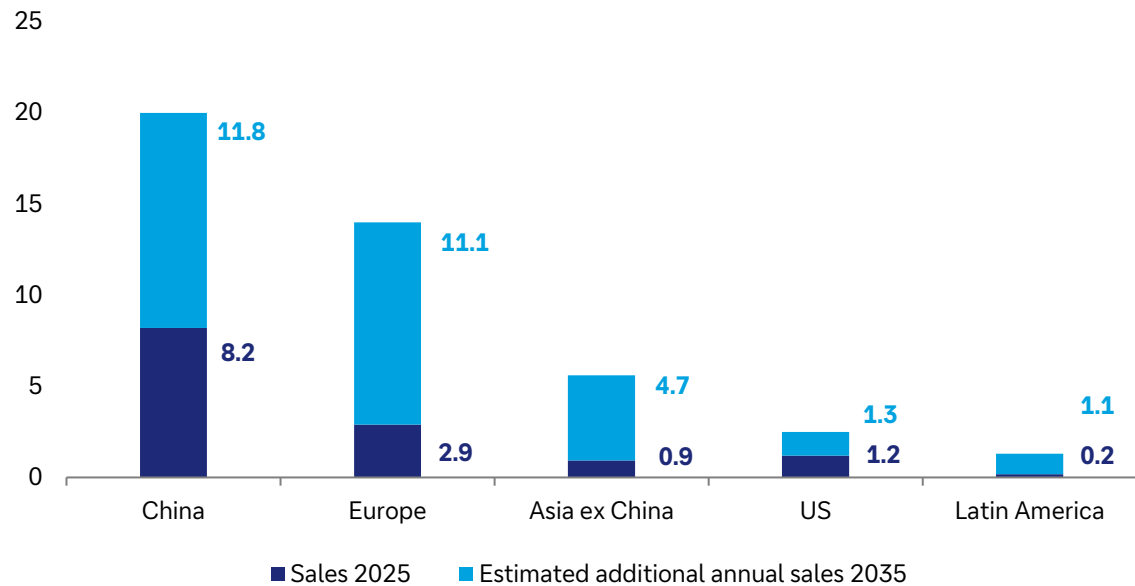
From digital intelligence to physical action





Most of EV sales growth in China, Europe, and rest of Asia

EV sales in million

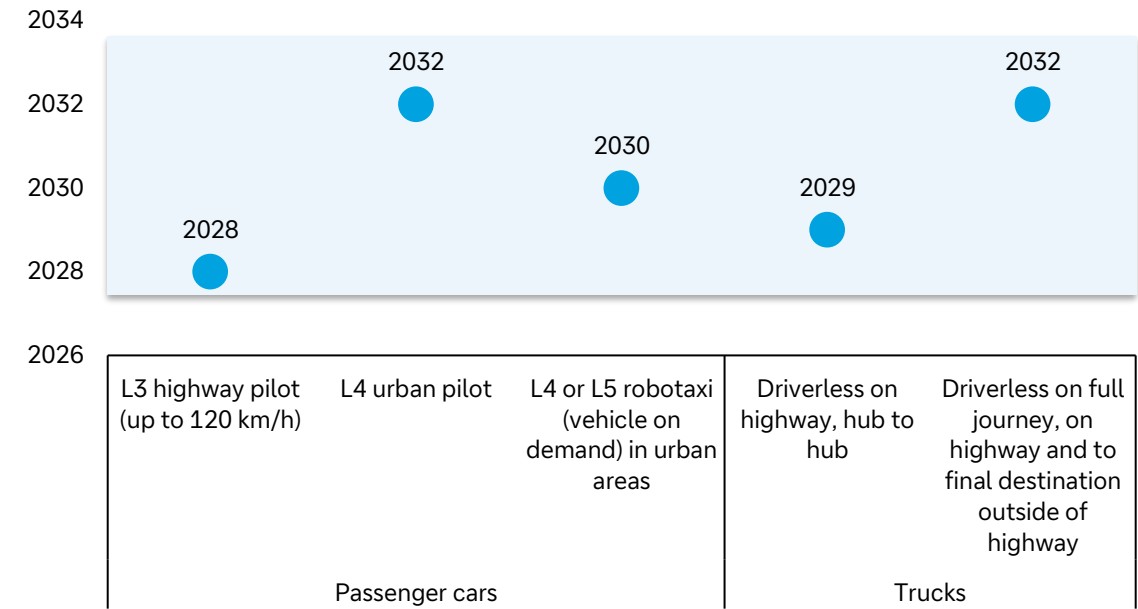


- As vehicles become more electric, connected and software-defined, smart mobility is expanding opportunities across **battery systems, power semiconductors, charging infrastructure, vehicle software, sensors and intelligent transport networks**.
- Electrification is advancing at different speeds across regions, with future demand increasingly determined by **vehicle affordability, charging availability, battery economics, policy support and competition from new market entrants**.
- Advances in AI are accelerating autonomous driving and strengthening demand for **high-performance computing, specialised semiconductors, perception software, large-scale data collection and integrated hardware–software architectures**.
- Across markets, the transition supports **automotive technology suppliers, battery manufacturers, semiconductor companies, charging operators and mobility platforms**, although pricing pressure, capital intensity, regulatory complexity and uneven regional adoption require careful selection.

Sources: IEA, Deutsche Bank AG, Data as of May 20, 2026; McKinsey, Deutsche Bank AG. Data as of January 6, 2026.

Lvl. 4 autonomous driving use cases expected to emerge soon

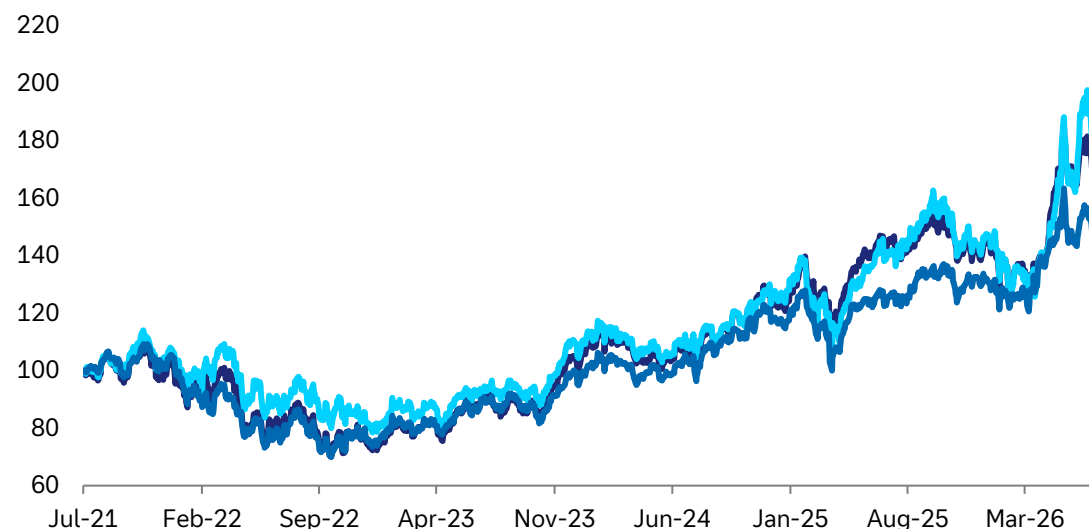
Expected year of mass deployment





Cyber Security stocks gaining momentum

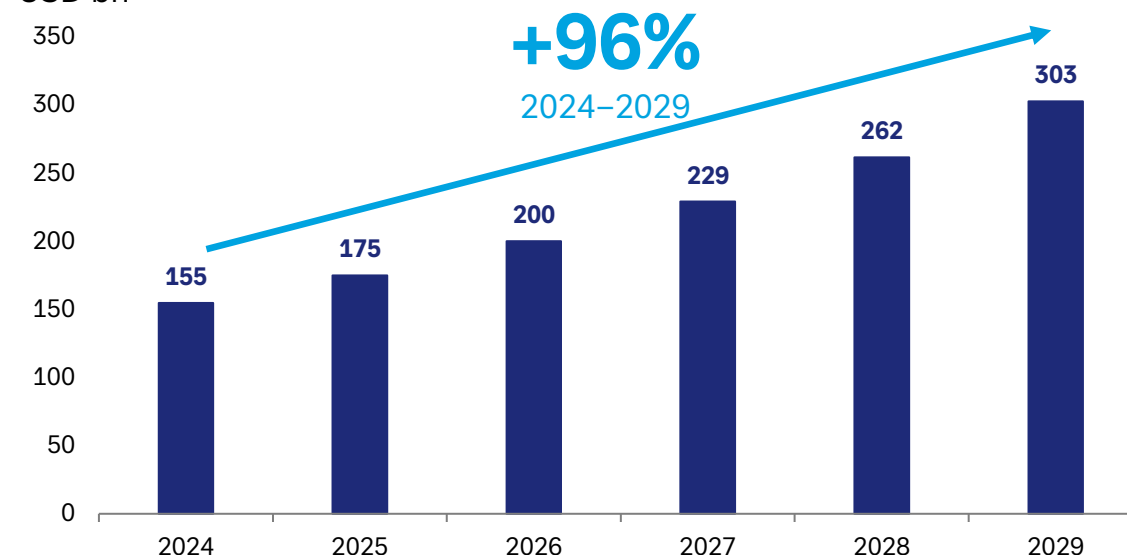
Total return (Indexed: -5Y=100)



— MSCI ACWI Cyber Security — S&P Kensho Cyber Security — STOXX Global Digital Security

Spending expected to keep rising

USD bn



■ Spending on cybersecurity worldwide

- As digitalisation, cloud adoption and AI expand the attack surface, cybersecurity is becoming a **structural and increasingly non-discretionary area of corporate technology spending**, supporting demand for identity protection, cloud security, threat detection and incident-response solutions.
- Global information-security spending is forecast to reach over **USD200bn in 2026**, with double-digit annual growth reflecting ransomware, regulatory requirements and the need to secure increasingly complex cloud and AI environments.
- The adoption of generative and agentic AI is creating opportunities on both sides of the market, as **AI strengthens threat detection and automated response while enabling faster, more sophisticated and scalable cyberattacks**.
- From an investment perspective, recurring revenues and high customer-retention rates can support **resilient growth and attractive cash-flow profiles**, although intense competition, elevated valuations, rapid technological change and platform consolidation require careful selection.

Sources: LSEG Datastream, Forrester Research, Deutsche Bank AG. Data as of October 2025.



2.5x indicates that one value is two and a half times another value.

AG stands for Aktiengesellschaft, a German public limited company.

Agentic AI describes artificial-intelligence systems that can plan, decide and act with limited human direction.

AI stands for artificial intelligence, the simulation of human intelligence by computer systems.

Bloomberg is a provider of financial data, analytics, software and news.

BloombergNEF is a research service focused on energy transition, commodities, transport and emerging technologies.

Billion (bn).

Capex is short for capital expenditure, spending on long-term assets such as equipment, buildings or infrastructure.

CBInsights is a market-intelligence platform covering private companies, technology and venture markets.

Deutsche Bank AG is a German multinational bank and financial-services company.

The **European Investment Bank (EIB)** uses financing to further EU policy goals; its shareholders are the EU member states.

El Niño is a periodic warming of the central and eastern tropical Pacific that can disrupt global weather patterns.

EUR is the currency code for the euro, the currency of the Eurozone.

EV stands for electric vehicle, a vehicle powered wholly or partly by electricity.

The **F-35** is a family of multirole combat aircraft.

The **United Nations Food and Agriculture Organization (UN FAO)** is a specialized agency of the United Nations that leads international efforts to defeat hunger.

Forrester Research is a research and advisory firm focused on technology, business and consumer trends.

GEN AI means generative artificial intelligence, which creates content such as text, images, code or audio.

GLP-1 is glucagon-like peptide-1, a hormone involved in blood-sugar

regulation and appetite control.

A **gross value added volume index** measures changes in inflation-adjusted economic output relative to a base period.

GW stands for gigawatt, a unit of power equal to one billion watts.

The **International Energy Agency (IEA)** is an intergovernmental agency studying energy-related issues.

The **International Finance Corporation (IFC)** is a World Bank Group institution focused on private-sector development.

Indexed performance rebases a series to a common starting value so that subsequent percentage changes can be compared.

IQVIA is a provider of data, analytics, technology and research services for the healthcare sector.

The **International Renewable Energy Agency (IRENA)** is an intergovernmental organisation that supports renewable-energy adoption.

kt stands for kilotonnes, equal to one thousand metric tonnes.

Level 4 autonomous driving allows a vehicle to operate without human intervention within defined conditions or areas.

LSEG Datastream is a financial and macroeconomic time-series database provided by London Stock Exchange Group.

LSEG Workspace is a financial-data and analytics platform provided by London Stock Exchange Group.

LTITs stands for Long Term Investment Themes.

McKinsey is a global management-consulting firm.

Medical technology, or medtech, is a broad term including healthcare products and services that commonly make increased use of information technology.

mRNA stands for messenger ribonucleic acid, which carries genetic instructions from DNA for protein production.

Mt stands for million tonnes, a unit of mass equal to one million metric tonnes.

MVREMXT is a Bloomberg data-series identifier cited in the publication.

NdPr means neodymium-praseodymium, a rare-earth combination used in high-strength permanent magnets.

Nvidia is a semiconductor and computing company specialising in graphics processors and accelerated computing.

NYGBIG is a Bloomberg data-series identifier cited in the publication.

The **Organisation for Economic Co-operation and Development (OECD)** has 35 member countries and has the objective of encouraging economic progress and world trade.

Our World in Data is a research and publishing platform that presents data on global economic, social and environmental issues.

PE stands for private equity, which refers to funds or individuals investing directly in private, non-listed companies.

Physical AI applies artificial intelligence to machines that sense, move and act in the physical world.

PitchBook is a financial-data provider focused on private capital markets, companies, funds and deals.

SPGTAQD is a Bloomberg data-series identifier cited in the publication.

Trillion (tn).

Total return combines an investment's price change with income such as dividends or interest.

TWh stands for terawatt-hour, a unit of energy equal to one trillion watt-hours.

The **United Nations Conference on Trade and Development (UNCTAD)** promotes development through trade, investment, finance and technology.

US is the United States.

USD is the currency code for the US Dollar.

Venture capital (VC) is a type of private equity financing, typically to small, early-stage, emerging firms.

The **World Bank Group** is a family of international institutions that finance and support development.

The **World Economic Forum** is an international organisation for public-private cooperation.

Historical performance



	11.8.2021 - 11.8.2022	11.8.2022 - 11.8.2023	11.8.2023 - 11.8.2024	11.8.2024 - 11.8.2025	11.8.2025 - 11.8.2026
MSCI ACWI IMI Robotics	-17.1%	14.7%	15.6%	21.4%	37.5%
S&P Kensho Robotics	-19.9%	8.5%	6.5%	6.1%	27.2%
iSTOXX FactSet Automation & Robotics	-21.4%	6.9%	10.2%	21.9%	45.7%
MSCI ACWI Cyber Security	-10.7%	0.1%	22.8%	29.6%	36.8%
S&P Kensho Cyber Security	-4.6%	-2.6%	19.3%	26.3%	42.5%
STOXX Global Digital Security	-3.9%	-2.9%	16.7%	13.1%	35.8%
Nasdaq Global AI and Big Data Index	-19.5%	19.8%	29.0%	32.5%	45.2%
MVIS Global Rare Earth/Strategic Metals Total Return Index	-6.5%	-22.4%	-50.6%	52.9%	38.1%
S&P Global Water Index	-13.8%	1.8%	12.4%	11.6%	4.1%

Source: LSEG Datastream, Deutsche Bank AG. Data as of August 11, 2026.

Important Information (1/5)



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