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US Equity Strategy & GVAT

Following AI's $1.6 trillion Money Trail: Mapping the Revenue Generated by the Capex Boom

We map hyperscaler and neocloud cash and lease capex to single-stock revenue. Our new lease capex estimates increase total AI investment by $195bn to $1.6tr in 2027. This capex drives ~25% of SPX sales growth next year, and AI enablers/adopters broadly account for 78% of earnings growth.

Key Takeaways

- Consensus has SPX capex/sales at 9%+ in 2027/28 vs 6% historically. We estimate AI investment exceeds 60% of 2027 capex across the SPX plus SPCX, NBIS and CRWV.
- This capex flows into supplier sales. We estimate AI investment will lift SPX sales growth by 200bps from 6.6% to 8.6% next year.
- Leases are synthetic capex. We introduce new hyperscaler lease models, increasing next year's total capex estimate by 14%–models available upon request.
- As capex growth moderates into 2028, where do we see opportunity? We screen for companies positioned to benefit from specific bottlenecks and gain market share.
- Our interactive capex map goes beyond identifying AI beneficiaries to quantify revenue exposure by company using MS analysts' insights. Please connect for data.

- **New estimates from our sector teams map $1.6 trillion of 2027 compute investment from hyperscaler and neocloud end customers to single-stock revenues.** Using our analysts' stock-level insights, we build a bottom-up estimate of AI capex-related revenue at the index level. Our tracking suggests a 65% absorption rate between AI Capex and S&P 500 companies, directly driving 5% of 2027 SPX sales and ~25% of SPX sales growth. More broadly, we see AI adopters and enablers driving a significant proportion of sales and EPS growth in 2027.

- **A growing portion of capex is being financed through leases. Our new lease capex estimates add $195 bn in 2027 and $246 bn in 2028 to headline capex, increasing total 2027 investment by ~14% .** Capex forecasts are increasingly not telling the whole story of capital investment

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because data centers acquired through leases, a form of debt-financed asset purchase, do not show up in cash flow statements as capex or management capex guidance. To address this, we forecast lease capex and incorporate it into our total capex estimates, which now reach $980 bn in 2026 (+~100% y/y) , $1.6 tr in 2027 (+~60% y/y), and $1.8 tr in 2028 (+14% y/y). We expect this investment to add an incremental 32 GW of compute capacity next year with an ROIC of 25-50%.

- **We expect hyperscaler investment to continue to favor large-cap semis, led by NVDA as revenue per GW scales toward $40 bn, with continued strength in AVGO and memory.** Following multiple compression since July, incremental upward revisions to AI capex could address concerns about cycle longevity. Within memory, DRAM remains a key bottleneck, yet international memory stocks trade at ~3x NTM P/E. We see the memory cycle entering its late stage, but not ending, in 4Q26, with moderating price increases and rising supply limiting further earnings surprises. In storage, STX and WDC benefit from HDD demand, and P from adoption of its flash storage technology.

- **Increasing chip and server complexity creates opportunities for design software providers and server manufacturers to add more value, providing an earnings driver beyond compute capacity growth.** Custom silicon investment is broadening the opportunity for Synopsys and Cadence across design software and IP while increasing system complexity supports Taiwan ODM earnings, with our team modeling 35–40% higher value-add per rack on VR200 versus GB300. In the US, DELL, HPE and SNX (through Hyve) are key beneficiaries across servers, networking and rack-scale infrastructure.

- **Power constraints favor onsite generation and high-quality equipment suppliers across Machinery, Power, and Multis.** EROC is most levered to hyperscaler spending within Machinery, with CMI and CAT also benefiting from backup and onsite generation demand. We expect upward capex revisions to extend power OEM backlogs at higher margins, benefiting GEV, INIO and BE. Across Multis, electrical and cooling suppliers (VRT, ETN, FPS, HUBB, TT, JCI, CARR) are expanding capacity as modular solutions support faster and simpler deployments amid increasing complexity and labor constraints, positioning suppliers to address customers' focus on speed.

- **With the cash-flow deficit among hyperscalers and neoclouds expected to widen next year, we anticipate financing needs to rise in 2027.** We continue to see capacity for the higher-rated hyperscalers to fund their investment plans, even at higher borrowing costs, while lower-rated borrowers are more exposed to financing constraints. We also expect the financing mix to shift as companies raise capital for chips and servers, which lend themselves to shorter-duration, amortizing structures, with greater flexibility to tie financing to contracted demand.

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Following AI's $1.6T Money Trail

US Equity Strategy and Global Valuation, Accounting and Tax

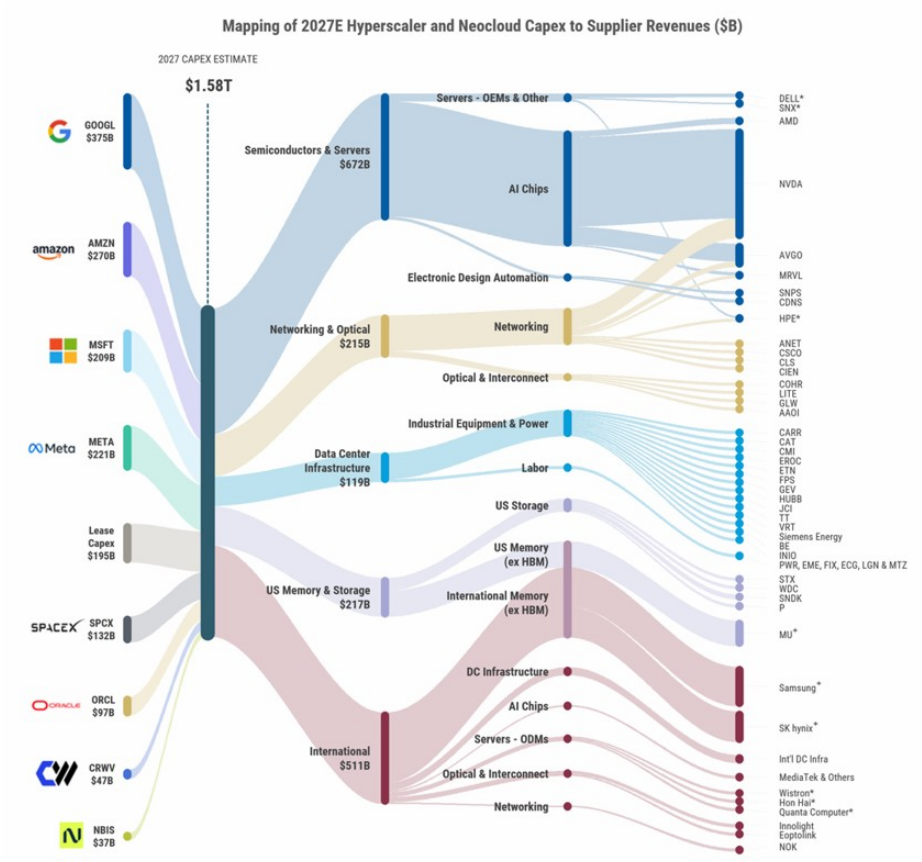
Tracking Hyperscaler and Neocloud Capex to Stock-Level Revenue. Our colleagues have regularly published models for capex per GW, GW capacity added per year, ROIC on AI capex (latest models published here), and power demand and supply estimates (here). But tracking all this capex spend to revenue dollars is a difficult exercise. While many companies have highlighted areas of their business that benefit from the AI infrastructure boom, AI revenue is rarely quantified.

Quantifying capex is also not straightforward–some companies are financing a substantial portion of their capex with leases, which bypasses capex on the cash flow statement. We create new estimates of lease capex across the hyperscalers. We then aggregate our lease capex estimates with hyperscaler and neocloud cash capex estimates for a comprehensive view of AI infrastructure spend, regardless of funding source.

Tracking capex dollars spent into revenues generated is further complicated as components pass through different entities within the AI infrastructure supply chain before landing in a data center. For example, our analysts estimate more than $130bn of HBM is sold from Samsung, SK Hynix, and Micron into Nvidia, Broadcom, AMD and other AI chip designers.

Then, Original Equipment Manufacturers (Dell and HPE) and Original Design Manufacturers (Wistron, Hon Hai, and Quanta Computer) assemble components–AI chips, memory, networking, power, cooling–into AI servers and racks. The OEMs and ODMs earn a 4% to 6% margin on the total component cost. To avoid double counting within the server supply chain, we include HBM revenue within accelerator revenues, and we include only OEM and ODM margin to capture their assembly contribution to AI servers.

We map $1.6T of capex to $1.7T of supplier revenues. This difference could be attributed to a number of variables, including (a) the challenge of splitting supplier revenues between hyperscaler and public neoclouds vs private neoclouds and bitcoin miners, (b) different expectations for timing of capex spend across companies, (c) price increases incorporated in supplier revenue estimates that have not been incorporated into capex estimates yet, among others.

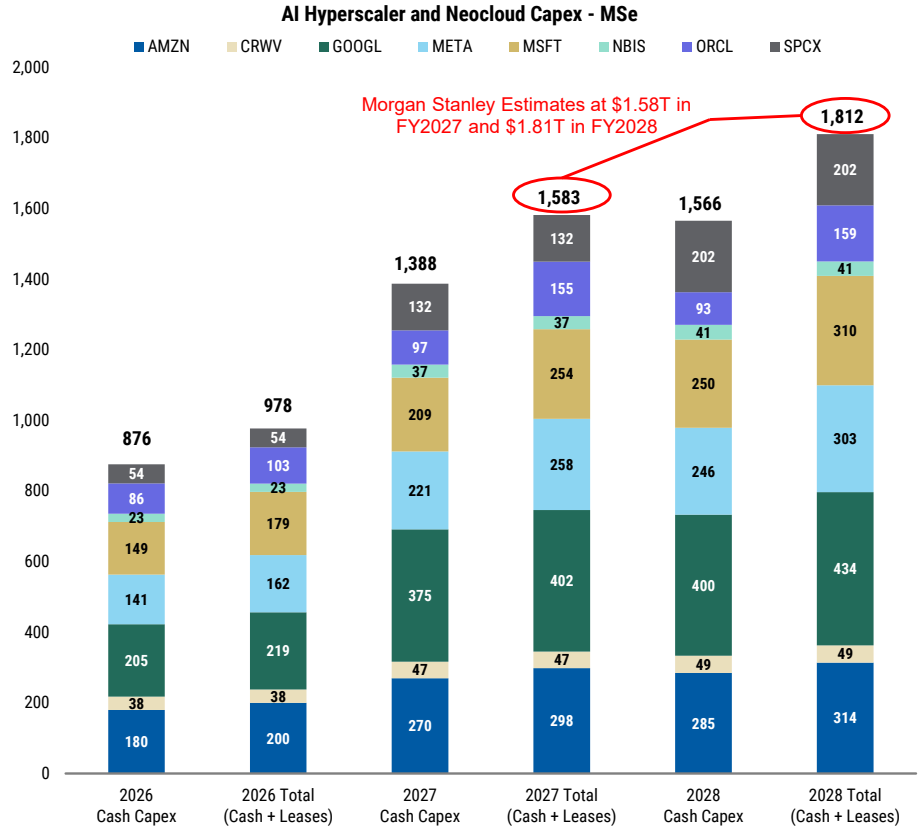


Note: Hyperscaler and neocloud capex figures are cash capex, leases aggregated separately, SPCX inclusive of estimated terafab capex, AMZN AWS capex only. *Includes only gross profit for OEMs and ODMs to capture assembly portion of hyperscaler/neocloud capex - semiconductors and other components included in revenue for those suppliers. +Excludes $30bn of HBM memory sales from MU, $57bn of HBM from Samsung, and $49bn HBM from SK Hynix sold into accelerators to avoid double counting revenues captured in AI chips. Source: Morgan Stanley Research

We update our total capex estimate to include lease-financed capex, adding ~$195B to our 2027 capex estimates now totaling to $1.58T (Exhibit 1). Capex forecasts are increasingly not telling the whole story as data center leases generally do not show up in analyst capex forecasts or management capex guidance. Hyperscalers disclose commitments to pay more than $1.1T for leases that have not yet started (Exhibit 3). We introduce new forecasts for assets acquired under leases across the hyperscalers as these purchases are economically similar to debt-funded capex but bypass GAAP capex on the cash flow statement (for a thorough discussion of lease capex and accounting, see AI: Leasing the Future). The key drivers of our forecast are company-disclosed leases signed but not yet started, our analysts' estimates of annual capacity additions, and the ratio of lease capex per GW added in the most recent year.

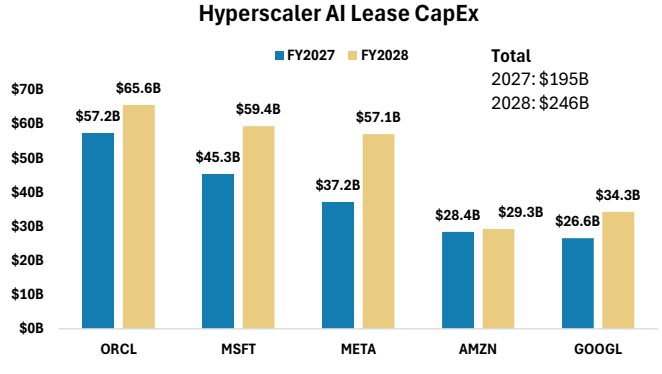
We then add our lease capex estimates to our analysts' hyperscaler and neocloud cash capex forecasts, using forecasted AWS capex for AMZN, and add estimated terafab capex at SPCX. Using this methodology, we estimate $1.4T of cash capex, which increases by 14% to $1.6T of total capex after incorporating leases. Inclusive of these changes, AI capex growth is expected to moderate from ~100% in 2026 to ~60% in 2027 and ~14% in 2028.

Exhibit 1: We add Hyperscaler Operating Leases to Capex Estimates to get to $1.58T FY2027 and $1.81T FY2028 Capex



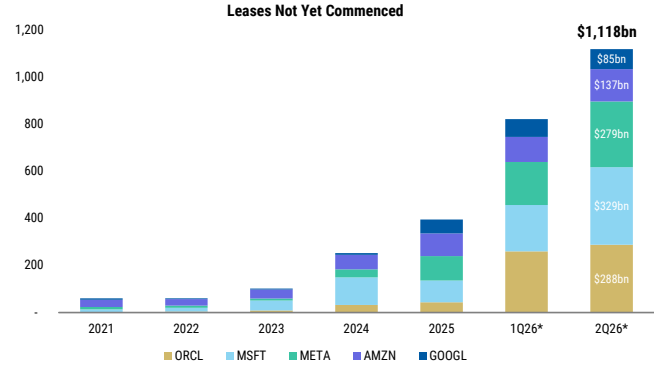
Source: Morgan Stanley Estimates.

Exhibit 2: We Calculate Lease CapEx at $195B in FY2027 and $246B in FY2028



Source: Company Filings and Morgan Stanley Research.
Note: MSFT and ORCL quarters aligned to most recent fiscal year

Exhibit 3: Leases Signed Not Yet Commenced



Source: Company Filings and Morgan Stanley Research.
Note: ORCL most recent two quarters aligned to Q1 and Q2 2026

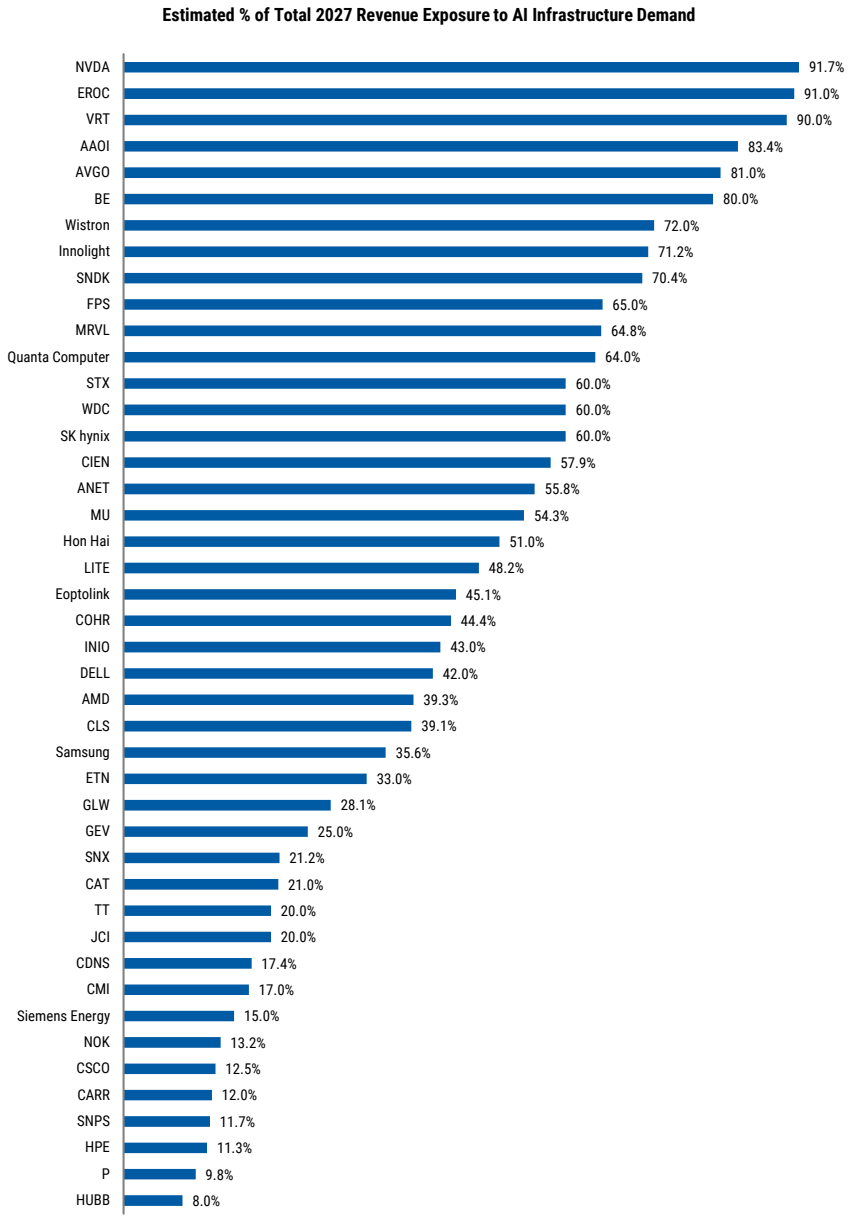
We surveyed our analysts across the AI infrastructure supply chain to track how hyperscaler and neocloud capex is flowing to individual companies. We track our compute capex estimate to ~50 companies' revenues across Tech, Communication Services, Industrials, Energy, and overseas ODMs. Across sectors, we see many companies growing rapidly as they win business to bring on compute for hyperscalers and neoclouds, and are thus seeing rising revenue exposure to the AI infrastructure build.

The largest beneficiaries are AI chips, memory, networking, and ODMs where NVDA, Samsung, SK Hynix, and Micron take the lion's share of hyperscaler/neocloud capex dollars within the group.

Industrials and power suppliers are increasingly exposed to data center construction as well. A lot of this spend is captured within our lease capex estimates where developers are constructing data center shells to lease to hyperscalers, and hyperscalers are signing PPAs (some of which are considered leases under US GAAP).

In Exhibit 4 below, our analysts provide their best current estimates of each company's revenue exposure to the AI capex trend. Given the lack of clarity, especially on the industrials side, we include second-derivative exposure to AI capex – including sales to power providers, general contractors, etc. that are not direct to hyperscalers/neoclouds in some cases – rather than attempting to determine which sales into power providers and contractors are to support specific data center demand.

Exhibit 4: Estimated 2027 Revenue Exposure to AI Infrastructure Capex Trend

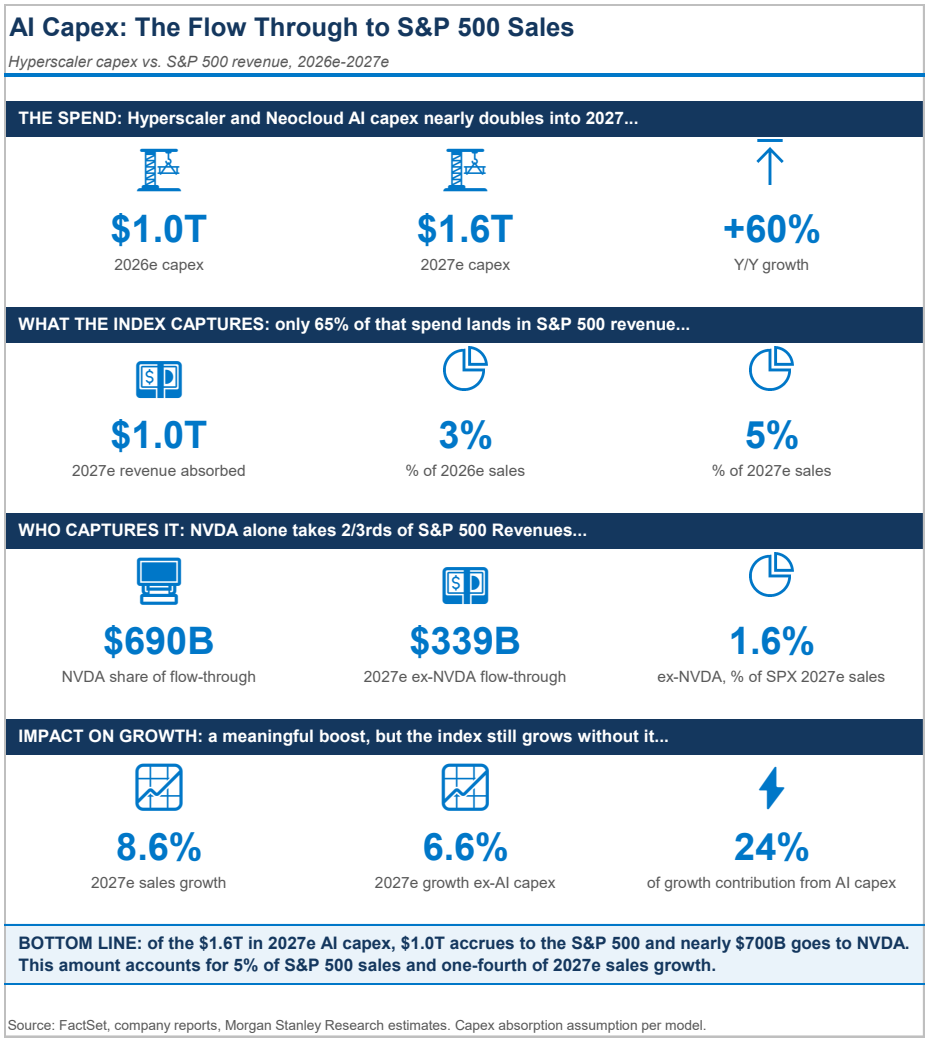


Source: Morgan Stanley Research.

How much does AI Capex drive S&P 500 revenues?

Based on our mapping, we find that revenue from hyperscaler and neocloud customers makes up 5% of total S&P 500 revenue in 2027 and drives ~25% of S&P 500 y/y revenue growth. With capex growth expected to moderate from ~100% growth in 2026 to ~60% in 2027 and LDD in 2028, the growth contribution decreases but the magnitude of this spending will continue to be impactful. From 2026 to 2027 alone, there's an incremental $700 bn earmarked to be spent on AI. Our estimates can track ~65% of this capex flowing into the S&P 500 with the largest portion flowing to NVDA. S&P 500 revenues ex-AI direct revenues are already growing a strong 6.6% and with AI capex impact, growth jumps to 8.6%. This underscores that S&P 500 revenue growth remains strong even without the direct impact of AI spending, which serves as a meaningful incremental growth driver.

Exhibit 5: $1.6T in Hyperscaler and Neocloud Capex Drives 5% of 2027 Sales and ~25% of Sales Growth



Source: FactSet, Morgan Stanley Research

Exhibit 6: S&P 500 Absorption Model

Hyperscaler AI Capex: Flow Through to S&P 500 Sales		
$ in millions unless noted	**2026e**	**2027e**
Hyperscaler AI capex	980,000	1,583,000
AI capex as % of S&P 500 sales	**5.1%**	**7.6%**
Revenue absorbed by S&P 500 (at 65% absorption)	635,517	1,028,950
S&P 500 sales	19,187,715	20,831,502
Absorbed AI revenue as % of S&P 500 sales	**3.3%**	**4.9%**
of which NVDA	*45%*	*67%*
S&P 500 sales growth	12.2%	8.6%
S&P 500 sales growth ex-AI	11.0%	6.6%
% of S&P 500 sales growth contribution from Hyperscaler Capex	**15%**	**24%**

Source: FactSet, Morgan Stanley Research

We looked for companies that could have pricing power in the future. With AI capex growth expected to moderate in 2028 from +60% in 2027 to +14% in 2028, we surveyed our analysts for compute suppliers that would have (a) better pricing power from ongoing or upcoming potential bottlenecks and/or (b) take market share as supply and demand become more balanced. We expect these companies to continue to see upward revenue and earnings revisions from the ongoing AI capex boom even if hyperscaler/neocloud capex revisions moderate. See Exhibit 7 for our top bottleneck and industry leader beneficiaries. For more on bottleneck risks (both to the upside and downside), see the Risks section.

Exhibit 7: Stocks that See the Most Pricing Power on Bottlenecks

Ticker	Name	Coverage Analyst	Price	Bottleneck Risk
CAT	CATERPILLAR INC	Angel Castillo	748.76	Power Bottlenecks
CMI	CUMMINS INC	Angel Castillo	526.14	Power Bottlenecks
EROC	EROCK INC-A	Angel Castillo	9.93	Power Bottlenecks
FPS	FORGENT POWER SOLUTIONS-CL A	Christine Yao	32.70	Pricing Power with Bottlenecks
GEV	GE VERNOVA INC	David Arcaro	941.60	Power Bottlenecks
INIO	INNIO NV	David Arcaro	16.50	Power Bottlenecks
BE	BLOOM ENERGY CORP- A	David Arcaro	239.54	Power Bottlenecks
DELL	DELL TECHNOLOGIES -C	Erik Woodring	507.43	OEM
HPE	HEWLETT PACKARD ENTERPRISE	Erik Woodring	63.18	OEM
P	EVERPURE INC-A	Erik Woodring	141.51	OEM
STX	SEAGATE TECHNOLOGY HOLDINGS	Erik Woodring	713.54	HDD
WDC	WESTERN DIGITAL CORP	Erik Woodring	364.10	HDD
NVDA	NVIDIA CORP	Joseph Moore	221.30	GPUs, Compute
AMD	ADVANCED MICRO DEVICES	Joseph Moore	570.82	CPUs, Compute
AVGO	BROADCOM INC	Joseph Moore	346.25	Compute
MU	MICRON TECHNOLOGY INC	Joseph Moore	914.13	Memory
SNDK	SANDISK CORP	Joseph Moore	1403.34	Memory
LITE	LUMENTUM HOLDINGS INC	Meta Marshall	896.33	Optical
005930 KS	SAMSUNG ELECTRONICS CO LTD	Shawn Kim	232000	HBM Bottlenecks
000660 KS	SK HYNIX INC	Shawn Kim	1419000	HBM Bottlenecks
VRT	VERTIV HOLDINGS CO-A	Toby Okwara	222.85	Pricing Power with Bottlenecks, Industry Leader
TT	TRANE TECHNOLOGIES PLC	Toby Okwara	471.29	Pricing Power with Bottlenecks, Industry Leader
JCI	JOHNSON CONTROLS INTERNATION	Toby Okwara	152.44	Pricing Power with Bottlenecks, Industry Leader
HUBB	HUBBELL INC	Toby Okwara	473.46	Pricing Power with Bottlenecks

Source: Morgan Stanley Research, Bloomberg. Price as of Oct 14, 2026.

How much do AI stocks drive the S&P 500 broadly?

For a different approach, we analyzed the breakdown of AI names within the S&P 500 versus non-AI names. Rather than isolating revenues tied to hyperscalers and large neoclouds as in the prior analysis, this approach captures the total sales and earnings contribution of companies broadly classified as AI-related. To determine AI names, we used the latest AI mapping (Global Thematics: The Thematic Map – Scaling Themes into AlphaSignals) and identified 42 names classified as "Core to Thesis" within our Enabler or Adopter categories.

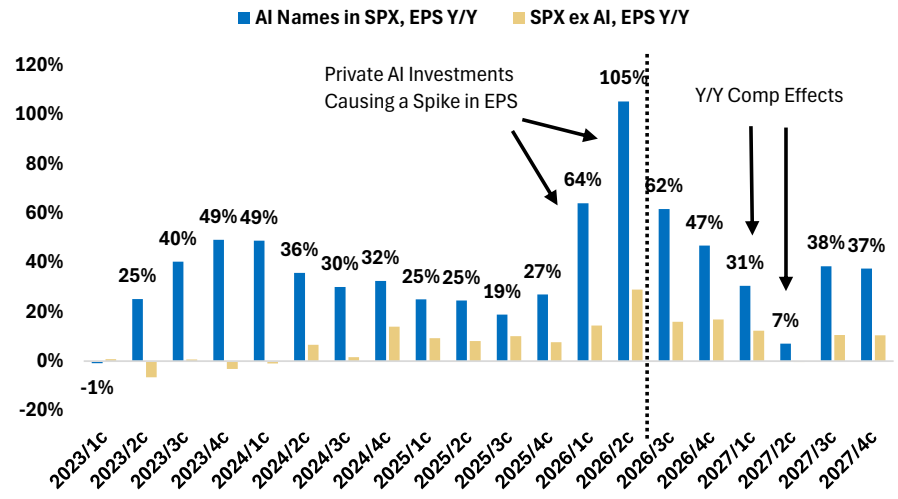
AI earnings are outpacing non-AI earnings. Both the AI cohort and the SPX ex-AI cohort are growing earnings in the double digits, and both cohorts show 2Q26 as the peak quarter for earnings growth (Exhibit 8). This peak could extend depending on how 3Q earnings season plays out relative to expected beat rates. Regardless, we appear to be near peak earnings growth — and markets trade on rate of change. The picture is further complicated by private AI investments showing up in non-operating profit, which skews the 1Q, 2Q, and full-year 2026 earnings picture.

With earnings growth now high but decelerating, market focus may shift toward who is incrementally improving EPS growth into 2027 — **a dynamic that favors the AI cohort**, where that growth is notably stronger. Taken together, AI remains a dominant theme in 2026's market, and we expect this to continue into 2027. That said, we think leadership will shift away from pure Enablers toward more blended Enabler/Adopters and Adopters, even as the AI theme broadly remains highly prevalent.

AI companies are growing 2027 sales at 28% versus 5% for non-AI companies (Exhibit 9). Sales for the S&P 500 broadly are very strong and in line with historical regressions versus nominal GDP. S&P 500 2027 sales growth is running at 9%; stripping out AI investment (assuming a 65% SPX absorption rate) would bring that down to roughly 7% — still in line with historical regressions of nominal GDP and historical sales growth. These points support our view that S&P 500 broadening is fully underway: growth would already be strong without AI investment, and AI spending is fueling incremental growth on top of that.

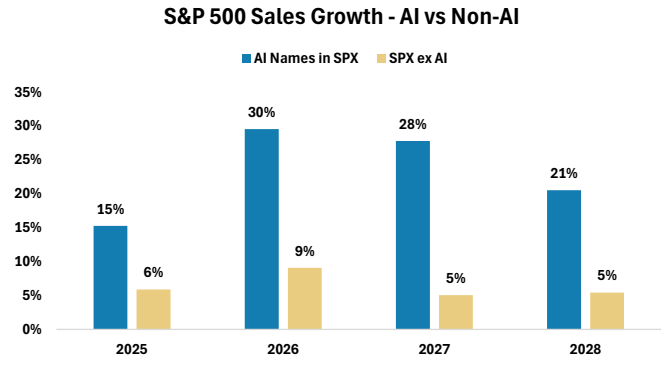
The growth numbers are significantly higher within AI names, but they're working off a lower absolute sales base. Sales for our "AI names" cohort represent 20% of S&P 500 total sales in 2026, rising to 23% and 26% in 2027 and 2028, respectively. The AI names category is heavily skewed by the Magnificent 7, which account for 14 of that 20 percentage points — roughly 70% of the cohort's sales. In terms of sales growth contribution, the AI cohort is driving 60% of 2027 S&P 500 sales growth (Exhibit 10).

Exhibit 8: Earnings from AI Companies are Outpacing the Rest of the Index



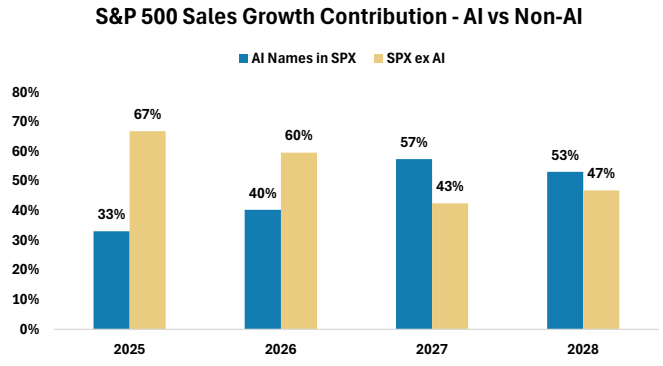
Note: AI stocks use the v6 AI Mapping and sorted on S&P 500 members with "Core to Thesis" in either Enablers or Adopters. Sample is 42 names. Source: FactSet, Morgan Stanley Research

Exhibit 9: Sales Growth



Source: FactSet, Morgan Stanley Research

Exhibit 10: Sales Growth Contribution

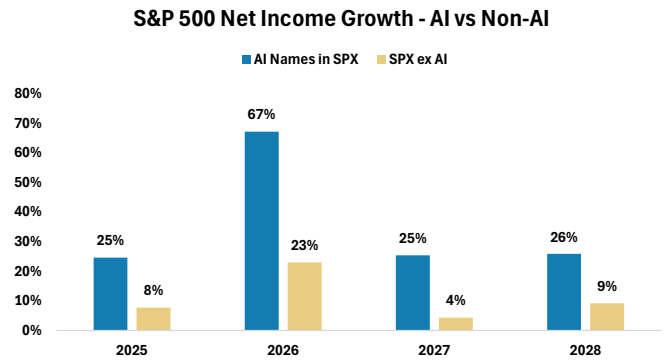


Source: FactSet, Morgan Stanley Research

AI companies are growing 2027 earnings at 25% versus 4% for non-AI companies (Exhibit 11). S&P 500 net income growth is tracking strongly at 12% in 2027, but that's a step down from 36% in 2026. The comparatively low 4% earnings growth in 2027 for SPX ex-AI is largely due to base effects from 23% growth in 2026 — which was historically very strong for the S&P 500 — and to the removal of some of the fastest-growing tech names from the ex-AI cohort.

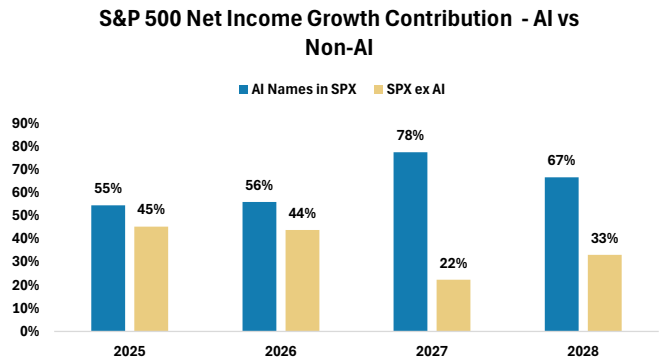
Looking at contribution, AI names in the S&P 500 are driving 78% of 2027 earnings growth (Exhibit 12). These AI names also represent a more significant and growing share of index-level net income, making up 37% of 2027 consensus. The Magnificent 7 drive about 75% of earnings within the AI cohort — similar to the sales breakdown.

Exhibit 11: Earnings Growth



Source: FactSet, Morgan Stanley Research

Exhibit 12: Earnings Growth Contribution



Source: FactSet, Morgan Stanley Research

Industry Breakdowns

We feature thoughts and analysis from our coverage Analyst teams below to discuss how AI capex is translating to their space, key names involved, and evolving debates in their space. We start with the key views from some of the major hyperscalers - which fund the majority of 2027 capex - and then focus on the end recipients of this investment.

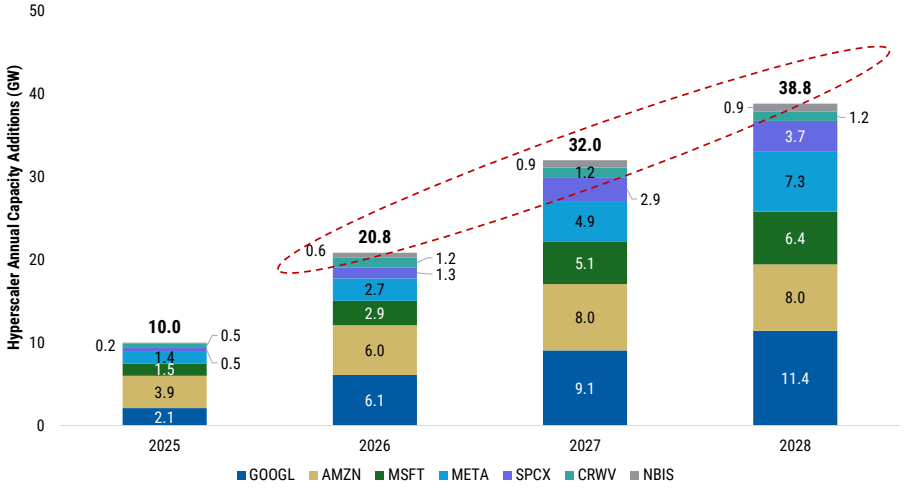
Hyperscalers

Brian Nowak, Julian Herrera, Nikhil Javeri

Where do we see Hyperscaler Capex Going Forward? We build our capex models on a bottom-up basis based on chip and rack counts/estimated shipments and cost/chip…and there are limits on the numbers of chips that are built/available to purchase. We estimate a substantial portion (in some cases 30-40%) of '26 capex is being spent on long-dated land, buildings, equipment, and power for data centers to open in '27'/28/'29. Hyperscalers are building further out for strategic reasons (being able to light up compute as it comes available) and political reasons (getting ahead of potential further political backlash against data center builds). While forward building will continue, there are limits as to how far out these pre-builds will go.

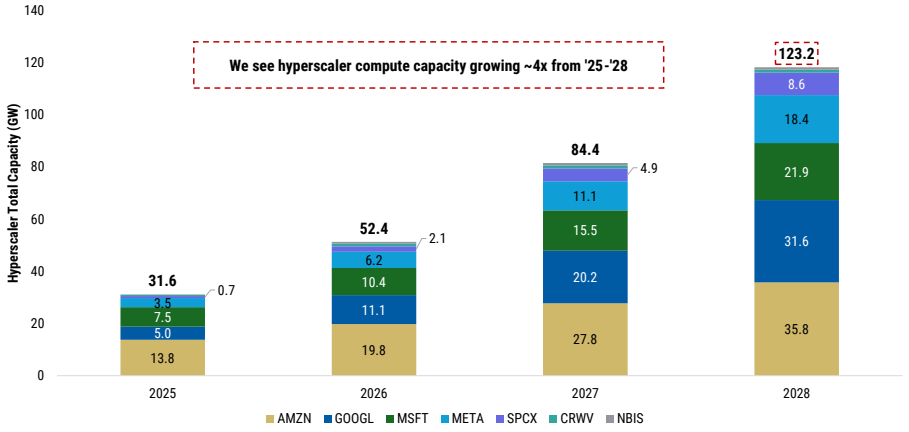
How Much Compute Capacity Do We See Coming On? We see the capex spend leading to ~70 GW of capacity coming online in '27/'28 (32 GW/38 GW). For perspective, this implies we reach ~145 GW of total compute capacity in '28, up ~4X from '25. We see custom ASICs rising from 34% of incremental capacity in '25 to 66% of incremental capacity in '28, driven primarily by Trainium and TPU, of which we think a combined 12 GW will come online in '28 (vs. 13 GW for NVDA). Compute capacity remains a scarce resource that will be monetized as it comes online (new GenAI enabled tools, agentic workflows, etc). This means hyperscalers, labs and enablers (AMZN, GOOGL, MSFT), and companies benefiting from diffusion across the economy benefit.

Exhibit 13: We see hyperscaler and neocloud capex adding ~85 incremental GW between '26-'28...



Source: Company data, Morgan Stanley Research

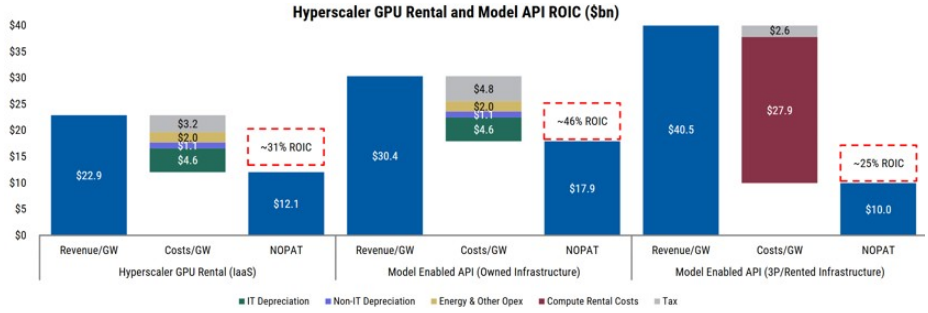
Exhibit 14: … and paving a path to ~125 GW by YE28, a 4X in compute capacity vs. '25



Source: Company data, Morgan Stanley Research

We are Bullish this Spend and the Attractive (25-50%) ROIC Ahead in the Age of Inference: We are bullish the long-term ROIC from these investments and have introduced 3 GenAI ROIC frameworks and models that detail the attractive (~25%+) incremental ROIC and unit economics that we believe can be generated from **1)** A Hyperscaler GPU Rental Business (IaaS) **2)** A Model Enabled API and **3)** A Model Enabled API Running on 3P Infrastructure. Generally speaking these analyses highlight the importance for model labs to continue to invest and innovate (to drive token pricing and token efficiency)...and the significant (and rising) value of data center capacity. And this all requires investment...which favors scaled players and leaves us bullish AMZN, GOOGL, MSFT and META. These healthy potential returns are also an invitation for competition, which speaks to how we should expect further new entrants/open source offerings to emerge...which will only further **1)** keep an importance on product and compute efficiency innovation, and **2)** highlight the value of compute infrastructure assets.

Exhibit 15: We also see paths to 25-50% ROIC on GenAI spend across three different business models...



Source: Company data, Morgan Stanley Research

A Model Enabled API Business: 70%+ Incremental EBIT Margins and 40%+ ROIC: There are multiple public (Google Gemini, Meta Muse, SpaceXAI Grok, etc.) and private model labs investing billions of dollars building and training large, medium, and small models. They then offer APIs to developers, enterprises, and SMBs to access models or applications built on models. These include agentic tools, data/workflow automation tools, and other productivity enhancers. Here again, while the investment is heavy, the incremental unit economics are attractive. In this case, we flex the percent of compute capacity used for inference (vs training) tokens/second/GPU (token throughput) and token pricing on the revenue side (critical levers for profit economics and ROIC).

Exhibit 16: … with the highest returns accruing to running a model-enabled API on 1P Owned Infrastructure…

ROIC of Model Enabled API on 1GW of Owned Infrastructure ($bn)						Notes:
Revenue:						
GB300 Chips in 1GW	410,256	410,256	410,256	410,256	410,256	MS est. of GB300 chips in 1GW datacenter
(X) % of Capacity Used for Inference	*50%*	*60%*	*65%*	*70%*	*80%*	Illustrative variable on % of capacity used for inference vs. training
(=) Revenue Generating Chips	**205,128**	**246,154**	**266,667**	**287,179**	**328,205**	
(X) Tokens/Second/GPU	3,500	3,000	2,750	2,500	2,000	MS est. range, Semianalysis Inference X, NVDA GTC
(X) Seconds per Year (k)	31,536	31,536	31,536	31,536	31,536	
(X) Utilization	*75%*	*75%*	*75%*	*75%*	*75%*	MS est. of uptime
(=) Tokens per Year (tn)	16,981	17,466	17,345	16,981	15,525	
(X) Token Pricing per Million	**$1.00**	**$1.50**	**$1.75**	**$2.00**	**$2.50**	MS est. range. Muse Spark 1.1 blended pricing $1.58 (8K/1K I/O)
(=) Revenue/GW	**$17**	**$26**	**$30**	**$34**	**$39**	
Costs:						
IT Depreciation Cost	$5	$5	$5	$5	$5	IT capex divided by IT useful life
(+) Non-IT Depreciation Cost	$1	$1	$1	$1	$1	Non-IT capex divided by Non-IT useful life
(+) Energy + Other Opex	$2	$2	$2	$2	$2	Energy, labor, maintenance, etc, industry/company data
(=) Total Opex/GW	**$7.6**	**$7.6**	**$7.6**	**$7.6**	**$7.6**	
EBIT & NOPAT:						
Incremental EBIT/GW	**$9.3**	**$18.6**	**$22.7**	**$26.3**	**$31.2**	
Incremental EBIT Margins	***55%***	***71%***	***75%***	***78%***	***80%***	
(X) Tax Rate	21%	21%	21%	21%	21%	
(=) NOPAT	**$7.4**	**$14.7**	**$17.9**	**$20.8**	**$24.6**	
% ROIC (NOPAT / Total Capex)	***19%***	***38%***	***46%***	***53%***	***63%***	
Capex for 1GW, GB300 Datacenter						
IT Capex	$23	$23	$23	$23	$23	MS est. IT capex per 1 GW DC of GB300s
Useful Life	*5*	*5*	*5*	*5*	*5*	MS est. servers + network useful life
Non IT Capex	$16	$16	$16	$16	$16	MS est. Non IT capex per 1 GW DC of GB300s
Useful Life	*15*	*15*	*15*	*15*	*15*	MS est. outside the rack useful life
Total Capex (IT + Non IT)	$39	$39	$39	$39	$39	

Source: Company data, Morgan Stanley Research

Hyperscaler GPU Rental (IaaS): 70% Incremental EBIT Margins and 30%+ ROIC: Our bottom up build of hyperscaler revenue flexes NVDA GPU (GB300) pricing per hour and utilization. The primary costs flowing through are IT (servers/networking) and Non-IT (powered shell) depreciation, energy costs, and other opex (labor, maintenance, etc). **While GPU pricing is the critical lever to monitor** (pricing varies by hyperscaler, chip, reserved instance vs. spot/on-demand and hyperscalers/neoclouds have recently been taking price on all instance types) in all, we estimate this business can generate ~60-70% incremental EBIT margins and ROIC of 25%-40%.

Exhibit 17: ...and 25-35% ROIC on the GPU Rental Business for a 1 GW GB300 data center

ROIC of Hyperscaler GPU Rentals (IaaS) on 1GW GB300 DC ($bn)						Notes:
Revenue:						
Annual Hours	8,760	8,760	8,760	8,760	8,760	24 hrs. x 365 days
(X) GB300 Chips in 1GW	410,256	410,256	410,256	410,256	410,256	MS est of GB300 chips in 1GW datacenter
(=) GPU Hours (billions)	3.6	3.6	3.6	3.6	3.6	
(X) Utilization (%)	*75%*	*75%*	*75%*	*75%*	*75%*	MS est. of utilization
(X) Est. Price/Hour	**$7.0**	**$8.0**	**$8.5**	**$9.0**	**$10.0**	MS est: GPU rental px/hr (range supported by industry/company data)
(=) Revenue/GW	**$18.9**	**$21.6**	**$22.9**	**$24.3**	**$27.0**	
Costs:						
IT Depreciation Cost	$5	$5	$5	$5	$5	IT capex divided by IT useful life
(+) Non-IT Depreciation Cost	$1	$1	$1	$1	$1	Non-IT capex divided by Non-IT useful life
(+) Energy + Other Opex	$2	$2	$2	$2	$2	Energy, labor, maintenance, etc, industry/company data
(=) Total Opex/GW	**$7.6**	**$7.6**	**$7.6**	**$7.6**	**$7.6**	
EBIT & NOPAT:						
Incremental EBIT/GW	**$11.2**	**$13.9**	**$15.3**	**$16.6**	**$19.3**	
Incremental EBIT Margins	***60%***	***65%***	***67%***	***69%***	***72%***	
(X) Tax Rate	21%	21%	21%	21%	21%	
(=) NOPAT	**$8.9**	**$11.0**	**$12.1**	**$13.1**	**$15.3**	
% ROIC (NOPAT / Total Capex)	***23%***	***28%***	***31%***	***34%***	***39%***	
Capex for 1GW, GB300 Datacenter						
IT Capex	$23	$23	$23	$23	$23	MS est. IT capex per 1 GW DC of GB300s
Useful Life	*5*	*5*	*5*	*5*	*5*	MS est. servers + network useful life
Non IT Capex	$16	$16	$16	$16	$16	MS est. Non IT capex per 1 GW DC of GB300s
Useful Life	*15*	*15*	*15*	*15*	*15*	MS est. outside the rack useful life
Total Capex (IT + Non IT)	$39	$39	$39	$39	$39	

Source: Company data, Morgan Stanley Research

What Happens in the Event of a Capex Slowdown for Hyperscalers?

We estimate Hyperscalers fund the majority of the AI buildout with OCF and we expect AMZN, GOOGL, META and MSFT to collectively generate ~$1tr in OCF in each of '27 and '28. Lower capex relative to expectations would allow more of that OCF to flow through to FCF, supporting positive FCF revisions, all else equal. However, we see two distinct scenarios with different implications for value:

1) Bullish: Capital intensity moderates as AI investments generate attractive returns. Installed capacity and GenAI applications, products and services monetize successfully, allowing OCF to grow with more moderate incremental investment. The hyperscalers see positive FCF revisions and a multiple re-rate as highly free cash flow generative GenAI winners.

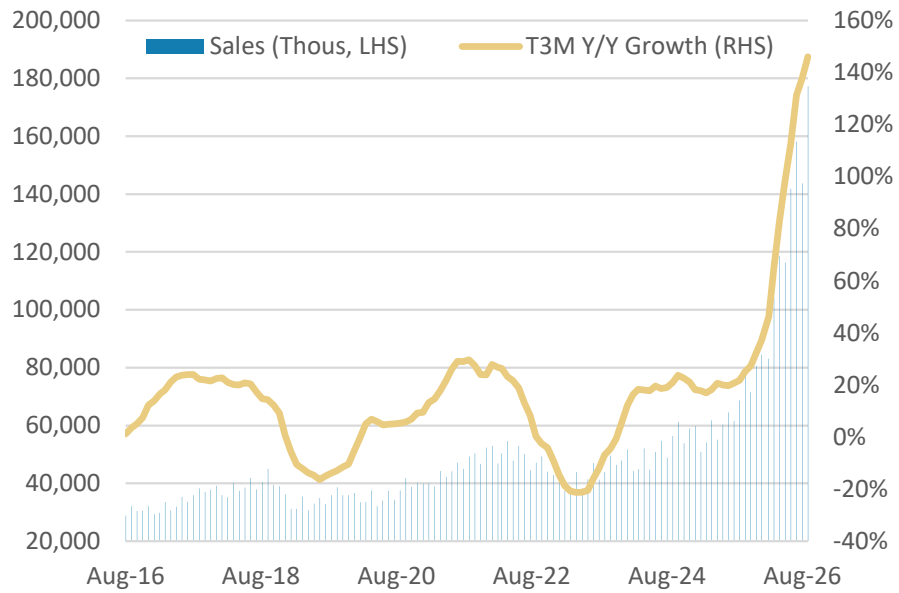
2) Bearish: Capex slows because AI investment returns disappoint. Utilization and monetization fall short of expectations, raising the risk of overcapacity and inadequate returns on the buildout. Lower capex and highly profitable core businesses could still support FCF, but positive revisions would depend on capex savings outweighing any OCF shortfall. Meanwhile, D&A and other committed infrastructure costs could drive earnings deleverage, with a risk of multiple de-rating as investors reassess capital allocation and long-term growth.

US Semis

Joseph Moore

After being dominated by PC and smartphone markets for most of the last two decades datacenter/AI is now the largest market in semis - making the hyperscalers the most important customers. The surge in revenue for the largest market cap stocks (Nvidia, Broadcom, Micron, AMD) can be almost entirely attributed to increased AI investment. Going forward we expect hyperscaler investment to continue to accrue to the large caps, especially Nvidia as they scale revenue per GW beyond $50bn with Fenyman, but we expect strength to continue to the likes of AVGO and memory. Additionally given how multiples have compressed in semis following the July peaks, upward revision to cloud capex could have a more positive impact on the sector, as longevity of the cycle has become the key concern for investors.

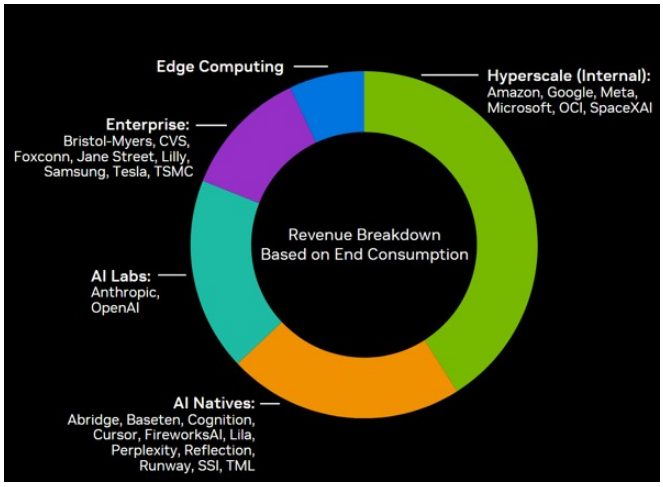
Exhibit 18: Semiconductor industry revenue



Source: SIA, Morgan Stanley

AI is still a relatively small high value market, with XPU shipments measured in the millions of units vs PC and mobile markets in the hundreds of millions of units annually. However this year as GW deployments have scaled we have seen AI make the transition to a high volume market, putting pressure on the semis supply chain - leading to higher ASPs in commodity components. That's increasingly showing up in areas of semis like analog, thought to have minimal exposure to AI several quarters ago as the TAM outgrows other areas. That's a positive for the group if hyperscalers continue to scale their spending aggressively, but if things slow whether via power bottlenecks, or ROIC concerns there will be no safe havens in the sector. For example a company like GFS, or ADI with minimal AI revenues 12 months ago has become a material portion of their respective businesses.

Exhibit 19: Nvidia

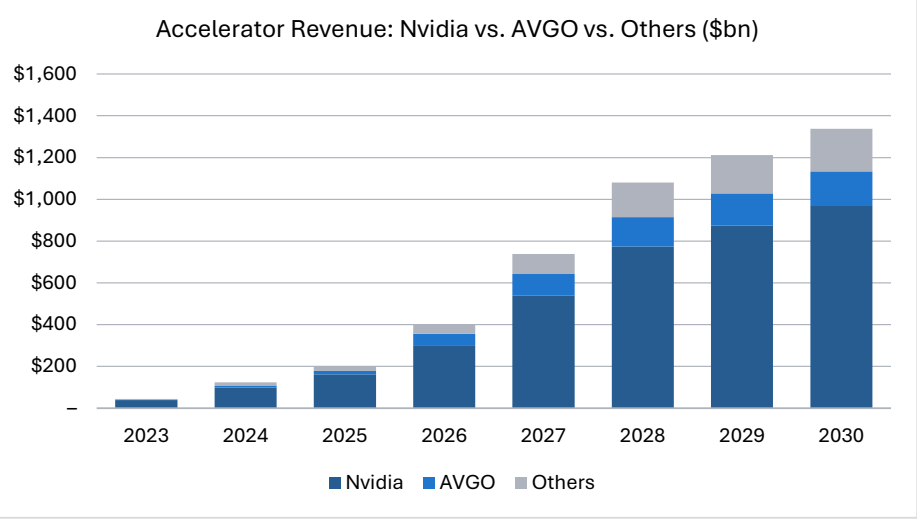


Source: Nvidia

Where would we be more concerned within semis if we do see a slowdown? If there is chip capacity expected to come online that cannot be deployed at data centers, we could see customers push out delivery or start canceling orders. There could be some bias to hold inventory of GPUs that can't be powered up to avoid losing positions in the queue, but given the annual cadence of new chip releases and limited power, the opportunity cost of using a less performant chip is high and companies should have the lead times to reroute orders to customers who are ready to take delivery. But in the event of a pause, we're likely to see the most disruption at the tail of the bullwhip, and where shortage driven pricing dynamics are supporting revenue and EPS. To us, that looks like memory, optics, and other small dollar content components that are most likely to be over-ordered such as power management and analog parts.

See Nvidia as best risk/reward as the market questions 2027 AI capex. Nvidia remains early in the ramp of a new product cycle, powered shell constraints play into the companies strengths, and recent agentic enthusiasm can accelerate Vera adoption. With the stock still relatively inexpensive at 15x FY28 EPS, there's opportunity for multiple expansion if enthusiasm returns to AI but multiple expansion is also not required for the stock to work as numbers continue to go higher.

Exhibit 20: We see a $1T XPU market by 2028



Source: Company Data, Morgan Stanley

The breadth of Nvidia's customer base also helps with land/power/shell, as those constraints are having the most impact on US based hyperscalers, with sovereign business creation as a result of countries that want to use their land/power/shell to create businesses. It also affords NVIDIA significant opportunities to drive revenue sharing agreements and valuable software/services revenue streams.

Exhibit 21: Conservative estimates for SPCX and AMZN create a low bar for remaining hyperscalers

Hyperscaler Capex → Nvidia Share	1Q26	2026	2027	Notes
SPCX Capex	$6,528	$53,726	$132,132	*MS Estimate*
Nvidia %	79.4%	79.4%	79.4%	
Nvidia $ Spend	$5,181	$42,640	$104,868	
Impled SPCX GWs	0.21	1.52	2.62	*SPCX management expects to deploy 3-8GW in 2027*
AWS Capex		$180,000	$270,000	*MS Estimate*
Nvidia %		22.2%	28.9%	
Nvidia $ Spend		$40,000	$78,000	*MS Estimate*
Nvidia Datacenter	$75,246	$361,636	$630,917	*MS Estimate (annuals calendarized)*
y/y growth			74.5%	*Nvidia guidance is 70% total revenue growth in FY28*
Nvidia Hyperscaler Segment	$43,050	$198,900	$337,541	
% of datacenter	57.2%	55.0%	53.5%	*Nvidia expects ACIE segment to outgrow hyperscale*
SPCX %	12.0%	21.4%	31.1%	
AWS %		20.1%	23.1%	
SPCX + AWS %		41.5%	54.2%	
SPCX + AWS % of growth			72%	
Implied Other Hyperscaler Spend	$36,522	$105,174	$127,409	
y/y growth			21.1%	*SPCX, AMZN numbers above imply Nvidia significantly*
Cons Capex for (MSFT, ORCL, META, GOOG)		$568,973	$789,410	*undergrows remaining hyperscaler capex ests...*
y/y growth		94%	39%	*...and that they lose share as a % of capex*
Implied Nvidia %		18%	16%	*...vs Nvidia's expecation that they will gain share of the top 5 CSP capex in 2027*

Source: Company data, Morgan Stanley

NVIDIA Corp.: Reinstating Top Pick as NDR supports our positive views (2 Oct 2026)

NVIDIA, neoclouds, and rev sharing: the next big debate (14 Aug 2026).

International Memory

Shawn Kim, Cindy Huang

Translating hyperscaler capex to revenue in memory

Memory reaches hyperscaler capex through two channels. HBM is co-packaged with the GPU or ASIC before sale, so it reaches the hyperscaler inside the accelerator vendor's invoice. Conventional server DRAM and enterprise SSDs are bought by the hyperscaler directly, or through the ODM on a consigned or buy-and-sell basis. To limit double counting with the AI chip node, the Samsung and SK hynix figures in Exhibit 11 exclude our estimate of memory sold through accelerator vendors, which is already counted in those vendors' revenue.

We estimate about 60% of SK hynix revenue and 50% of Samsung memory revenue is tied to accelerator vendors and hyperscalers combined. Samsung's lower share partly reflects its larger mobile and PC exposure. After deducting memory sold through accelerator vendors, roughly 47% and 40% respectively is bought directly by hyperscalers.

Neither company discloses a full customer breakdown. Nvidia was 24% of SK hynix revenue in 2025 and 13% in 1H26, and we use the 1H26 share as the SK hynix deduction. For Samsung, we use HBM's share of revenue as a proxy. Both deductions likely understate memory sold through accelerator vendors. The SK hynix figure excludes HBM sold to ASIC vendors, and the Samsung proxy excludes low-power and graphics DRAM sold to Nvidia. We would therefore treat both direct shares as upper bounds.

How would further capex revisions affect memory?

In the near term, memory output cannot respond quickly to new orders, because adding bits depends on cleanroom space and tool lead times. Upward capex revisions for 2027 therefore reach memory mainly through price rather than volume. With margins near 80%, most of any price increase falls to operating profit.

The link also runs the other way. As the ODM section notes, a meaningful part of recent capex raises reflect higher component costs rather than more servers; Amazon attributed most of its capex lift to rising memory costs, with no change to its build plan. Headline capex growth is therefore partly a memory-price variable. If contract price growth slows as we expect into 4Q26 and 2027, hyperscalers can report slower capex growth while building the same number of servers. For this note, memory pricing is one of the swing factors in the US$1.6T 2027e figure itself.

Forward outlook

For memory, the debate is 2027, and it is about the rate of change. Memory stocks have historically tracked two variables: the year-on-year change in contract pricing, and whether supply is tightening or loosening. They have tended to turn about four months before y/y pricing peaks.

Our view is that the cycle moves into its late stage by 4Q26 but is not finished. Price increases are moderating from 4Q26, inventories are starting to rise, and supply growth is creeping in, which limits further upside earnings surprises. DRAM has become one of the key bottlenecks to the AI build-out, yet memory stocks trade at roughly 3x NTM P/E, implying little growth premium.

Long-term agreements are larger and longer this cycle. Hyperscalers aim to cover at least 90% of DRAM demand through LTAs, and Samsung targets 60-70% of its capacity under rolling five-year contracts with advance payments. In our view, LTAs change the shape of a correction without removing the cycle. A downturn would look like a volume air pocket at a held price, rather than an immediate price break.

Key investor debates & risks

- Timing of the pricing peak. Investors are asking whether 2027 earnings upgrades can continue once y/y price growth rolls over. Historically, the stocks have moved ahead of the pricing data rather than with it.
- Capital allocation. As pricing momentum fades, the emphasis shifts to capital returns, earnings stability through LTAs, and free cash flow. SK hynix is buying back and cancelling W40tn of shares and has raised its return target to over 50% of 2025–27 FCF. Samsung set a W90–110tn shareholder return for 2026, slightly below buy-side expectations. About W30tn of that is a 3Q dividend, and we expect most of the remaining W60–80tn, due to be decided in January 2027, to come as buybacks and cancellation.
- Supply response. CXMT raised about US$8.6bn in its July STAR Market IPO, mainly to fund memory wafer capacity, and we model it entering HBM from 2026. The incumbents' own capex is also rising. Faster supply growth is the main route by which pricing normalizes.

- Downside risk. Strong forward buying and inventory building at hyperscalers can reverse quickly. In the 2022 downturn described in the Risks section, memory shipments fell about 5% from peak while spot prices fell 20-30%. A plateau in hyperscaler capex, even without a decline, would hit memory pricing before volumes.

Optical/Networking

Meta Marshall, Antonio Jaramillo

Networking's capture of incremental capex has held steady. Across our 15-company networking universe, each incremental dollar of hyperscaler and neocloud capex has generated about $0.25 of incremental networking revenue, at $0.252 in CY25, $0.250 in CY26E and $0.247 in CY27E. Street estimates have networking revenue rising from $93bn in CY24 to $376bn in CY27E, while combined capex grows from $256bn to $1.39tr. Because capex grows faster, networking's share of capex declines from about 36% to about 27%. This reflects build composition, not a loss of relevance. The remaining ~75c goes to accelerators, servers, power, cooling and data center shells, which are taking a larger share of each deployment. The key question is how much of the ~25c comes from hyperscaler and neocloud customers versus enterprise, telco and other end markets.

The base case implies ~$0.15 of hyperscaler networking revenue per capex dollar. With the hyperscaler and neocloud share held flat at 60%, each incremental capex dollar in CY27E generates about $0.148 of hyperscaler-linked networking revenue (Exhibit 22) or ~$150mm per $1bn of capex. Combined capex is expected to rise by about $529bn in CY27E, implying roughly $78bn of incremental hyperscaler-linked networking revenue and about $225bn in total. The ~15c is about 60% of the ~25c networking capture. The other ~10c comes from enterprise, telco and other customers whose spending is rising alongside the AI build-out. On this ratio, a $100bn change in combined hyperscaler and neocloud budgets moves annual networking revenue by about $15bn, before any change in customer mix.

Customer mix matters more than market size. Flexing the hyperscaler share from 40% to 80% moves the per-dollar figure from $0.099 to $0.198. Each 10-point change in share is worth about $0.025 per capex dollar, or roughly $38bn of CY27E revenue. A 10% change in total networking revenue at a 60% share moves the figure by about $23bn. Across the full grid of 40% to 80% share and ±20% networking revenue, CY27E hyperscaler-linked revenue ranges from $120bn to $361bn.

Exhibit 22: Each incremental hyperscaler capex dollar generates ~$0.15 of networking revenue at a 60% customer share - every 10 points of share moves CY27E hyperscaler-linked revenue by ~$38bn.

Incremental Hyperscaler + neocloud revenue / $ of incremental capex (CY27E)						
		Incremental networking revenue per $ of incremental capex				
		$0.20	$0.22	$0.24	$0.26	$0.28
Hyperscaler / Neocloud Share	40%	$0.08	$0.09	$0.10	$0.10	$0.11
	50%	$0.10	$0.11	$0.12	$0.13	$0.14
	60%	$0.12	$0.13	**$0.15**	$0.16	$0.17
	70%	$0.14	$0.16	$0.17	$0.18	$0.20
	80%	$0.16	$0.18	$0.20	$0.21	$0.22

Source: Company data, Morgan Stanley Research, Visible Alpha estimates

Street estimates sit above the base case because they assume continued share gains. Rolled up at the company level, consensus has the hyperscaler share rising from 30% in CY24 to 41% in CY25, 54% in CY26E and 59% in CY27E. That implies capture of about $0.17 per capex dollar in CY27E, with the extra ~2c over the base case coming from mix shift. On an incremental basis, consensus has hyperscalers taking about 68% of new networking dollars versus 59% of the total. CY27E hyperscaler revenue of $220bn is close to the $225bn flat-share result, so the level of consensus looks reasonable. The growth trajectory depends on hyperscaler mix continuing to rise through CY27. If share stalls in the mid-50s, capture falls toward ~$0.15 or below, and the names with the most hyperscaler exposure carry most of the estimate risk.

Exhibit 23: Hyperscaler revenue across ANET, CSCO, CIEN, GLW, LITE and COHR is set to quadruple to ~$40bn by CY27E, rising from 18% to 39% of combined revenue.

HS + neocloud networking revenue by company ($mm)	CY24	CY25	CY26E	CY27E
Corning (GLW)	$1,302	$2,464	$4,320	$6,398
Lumentum (LITE)	$507	$1,083	$2,624	$4,834
Coherent (COHR)	$1,893	$2,715	$4,260	$6,338
Ciena (CIEN)	$1,261	$2,074	$3,471	$4,840
Cisco (CSCO)	$417	$2,350	$5,858	$9,081
Celestica (CLS)	$2,971	$5,297	$8,583	$13,898
Applied Opto (AAOI)	$97	$201	$707	$2,469
Arista (ANET)	$3,778	$5,133	$7,156	$8,927
Broadcom (AVGO)	$4,089	$8,998	$20,251	$38,393
Marvell (MRVL)	$2,744	$3,843	$6,334	$9,153
HPE (Networking)	$96	$774	$1,650	$2,016
Innolight (300308.SZ)	$1,798	$3,172	$9,927	$20,849
Eoptolink (300502.SZ)	$592	$1,954	$4,594	$6,182
NVIDIA (Networking)	$7,794	$21,336	$59,515	$100,645
Nokia (Network Infra.)	$521	$1,168	$1,979	$3,207
Total hyperscaler + neocloud revenue	**$29,860**	**$62,560**	**$141,229**	**$237,230**
Y/Y growth		*109.5%*	*125.7%*	*68.0%*
% of total networking revenue	***32.0%***	***44.4%***	***57.7%***	***63.4%***

HS + neocloud vs. other networking revenue ($mm)	CY24	CY25	CY26E	CY27E
Hyperscaler + neocloud revenue	$29,860	$62,560	$141,229	$237,230
Y/Y growth		*109.5%*	*125.7%*	*68.0%*
Other networking revenue	$63,309	$78,308	$103,402	$136,759
Y/Y growth		*23.7%*	*32.0%*	*32.3%*
Total networking revenue	**$93,169**	**$140,868**	**$244,632**	**$373,989**
Y/Y growth		*51.2%*	*73.7%*	*52.9%*
Hyperscaler + neocloud contribution (pts)		*35.1%*	*55.8%*	*39.2%*
Other networking contribution (pts)		*16.1%*	*17.8%*	*13.6%*

Hyperscaler capex vs. HS + neocloud networking rev. ($mm)	CY24	CY25	CY26E	CY27E
Hyperscaler + neocloud capex (7 cos.)	$255,633	$445,042	$861,158	$1,390,506
Y/Y growth		*74.1%*	*93.5%*	*61.5%*
Hyperscaler + neocloud networking revenue (15 cos.)	$29,860	$62,560	$141,229	$237,230
Y/Y growth		*109.5%*	*125.7%*	*68.0%*
Networking revenue as % of capex	**11.7%**	**14.1%**	**16.4%**	**17.1%**
Incremental revenue per $ of incremental capex		*$0.17*	*$0.19*	*$0.18*

Source: Company data, Morgan Stanley Research, Visible Alpha Estimates

We outline key downside risks should hyperscaler capex growth moderate:

- **Capacity expansion could create oversupply and accelerate pricing pressure.** Significant investments in InP laser fabrication and high-speed transceiver manufacturing are being made against expectations of sustained demand growth. If supply additions outpace deployments, current shortages could give way to excess capacity, accelerating ASP declines and pressuring margins through lower factory utilization and increased competition.
- **Diminishing performance gains from faster networking could extend optical upgrade cycles.** Hyperscaler investment in higher-speed interconnects is predicated on improvements in AI training efficiency, inference throughput and overall cluster utilization. As network bandwidth constraints ease, incremental increases in transmission speeds could deliver diminishing performance benefits relative to their cost, potentially slowing adoption of successive optical generations and limiting future upgrade demand.

- **Higher bandwidth density and evolving architectures could reduce optical content per unit of network capacity.** Migration toward 1.6T, 3.2T and eventually 6.4T transceivers could reduce the number of modules required for a given amount of bandwidth where connections can be consolidated, while faster optical lanes reduce the number of laser chips needed per terabit. Greater adoption of silicon photonics, co-packaged optics and copper connectivity could further shift spending away from conventional EML-based transceivers, leaving suppliers increasingly dependent on bandwidth growth and higher component ASPs to offset lower unit intensity.

Electronic Design Automation (EDA)

Lee Simpson, Amelia Scicluna

Hyperscalers are an increasingly important customer group for Synopsys and Cadence. Semiconductor companies and foundries remain central to demand, but hyperscaler investment in custom silicon broadens the opportunity across chip-design software and semiconductor IP. We see sensitivity across both IP and EDA:

1. IP: Synopsys' new royalty IP model increases hyperscaler sensitivity.

Synopsys' expansion from standards-based IP into application-optimised IP (AOIP) broadens both the offering and the monetisation opportunity. AOIP addresses customers' specific chip requirements and, under the commercial structure described at their investor day, combines a licence per programme, a customisation fee and a production royalty. The key addition is volume-linked revenue alongside programme-level licensing and engineering fees. The multi-year Amazon (covered by Brian Nowak) partnership, spanning multiple generations of Graviton, Trainium and Nitro chips, illustrates customer traction for the expanded offering.

Royalties create a more direct link between Synopsys' IP revenue and deployment of the relevant custom chips. The opportunity depends not only on programme wins, but also on the volumes those programmes ultimately achieve. This adds potential upside as successful designs scale into production, alongside downside from delays, lower volumes or cancellations.

Importantly, this is not a one-for-one sensitivity to hyperscaler capex. Higher spending supports royalty growth only where it increases production of chips incorporating royalty-bearing Synopsys IP. The magnitude and timing of the opportunity depend on royalty terms, production schedules and the proportion of Synopsys' revenue attributable to these programmes.

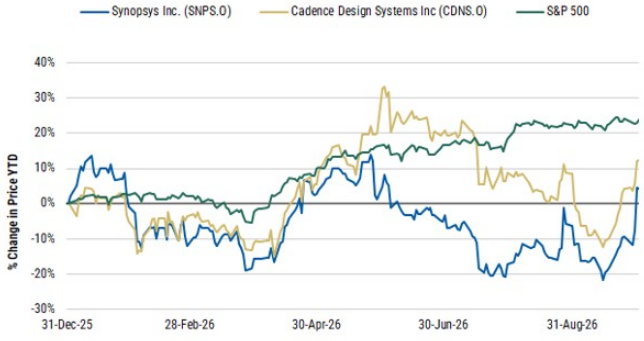
2. EDA: Hyperscaler design investment, not shipment volumes

As hyperscalers expand their in-house silicon development, they buy the software needed to design, verify and implement those chips. For both Synopsys and Cadence, we see the opportunity as primarily a function of the number of active design programmes, the cadence of new chip generations and the complexity of each design. Greater design complexity can require more verification effort, more specialised tools and additional licensed capacity, but more engineering work does not necessarily translate into an immediate or proportional increase in software revenue. Where customers operate under multi-year or pooled licence agreements, higher activity may be monetised through capacity additions, broader product adoption or subsequent renewals. We see scope for EDA demand to remain resilient to lower production volumes where design roadmaps remain intact. Conversely, fewer programmes, delayed development schedules or reduced design budgets would weaken the opportunity even before any effect on chip shipments.

The key debate: AI disrupted or an AI beneficiary?

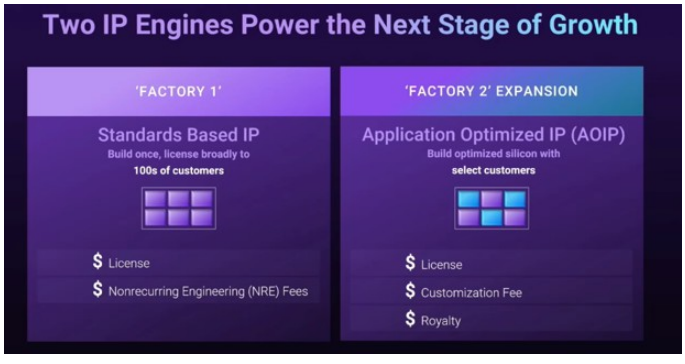
EDA have underperformed the market YTD as investors labelled them as AI disrupted. We think this concern is overdone as instead we think AI can add incremental upside to the EDA TAM. For instance Synopsys' investor day signalled 3 paths of AI monetisation: (i) Synopsys Full Stack, (ii) Customer Owned Platform + Agents and (iii) Frontier Models e.g. GPT-Synopsys (see From Narrative to Execution). The key proof point for a sustained re-rating will be evidence that these AI pathways can translate into earnings growth.

Exhibit 24: Synopsys and Cadence underperformed the S&P 500 YTD.



Source: FactSet, Morgan Stanley Research

Exhibit 25: Synopsys' introduction of an Application Optimised IP model increases sensitivity to hyperscalers.



Source: Synopsys Investor Day

Typically defensive, but potentially less so in a deep downturn. We see a deep semis downturn as a risk for our EDA companies, despite contract structures and recurring revenue streams that typically make them less cyclical than the broader semiconductor industry. This defensiveness could weaken if chip vendors cut R&D spending, push out new tape-outs or delay chip development projects. Export controls and the emergence of domestic Chinese competition are also key risks for EDA.

Tech Hardware

Erik Woodring, Maya Neuman, Dylan Liu

Within our IT Hardware coverage, hyperscaler capex flows primarily to the storage and enterprise infrastructure vendors supplying the underlying hardware required to build out cloud and AI data centers. The most direct beneficiaries in our coverage are the HDD vendors, Seagate (STX) and Western Digital (WDC), which supply high-capacity nearline drives used for hyperscale storage, and the enterprise infrastructure OEMs/manufacturers - Dell (DELL), HPE, P and SNX through its Hyve business - which provide the AI servers, traditional servers, networking and rack-scale infrastructure underpinning hyperscaler and neocloud deployments. As hyperscalers continue to increase investment in AI and cloud infrastructure, we see these six companies as the primary conduits through which that capex translates into revenue and profit across our coverage universe.

DELL (EW): We forecast Dell generating ~$6.6B of gross profit from T2 CSPs/neoclouds in CY27, on ~$123B of revenue, making it by far the largest hyperscaler/neocloud profit exposure of our OEM coverage. Dell's exposure is primarily through AI compute infrastructure - GPU accelerated servers and integrated rack-scale systems sold to neoclouds/CSPs building AI capacity - with AI servers accounting for ~$119B of revenue and ~$5.5B of gross profit while traditional general-purpose servers sold into these customers contribute another ~$4B of revenue and ~$1.1B of gross profit.

HPE (OW): We forecast HPE generating ~$2.1B of gross profit from T1 hyperscalers, T2 CSPs and neoclouds in CY27, on ~$6.3B of revenue, with exposure spread across networking, traditional servers and AI servers. Networking is the largest contributor at ~ $1.2B of gross profit, reflecting HPE/Juniper's exposure to the high-speed networking infrastructure required to connect large cloud and AI data centers (including the recently announced ORCL win), traditional servers contribute ~$825M of gross profit, while AI server sales to T2 CSP/neocloud customers contribute ~$85M of gross profit.

P (OW): While management did not provide specific guidance on the future revenue contribution from hyperscale and Neocloud customers, it expects hyperscalers, Neoclouds, and data software solutions collectively to represent ~20% of total revenue by 2030. In the near term, we forecast P generating ~$700M of revenue from hyperscale customers, primarily through DFM flash controllers and PCBs, and an additional $50-100M from Neoclouds through Everpure storage systems in CY27/FY28.

SNX (OW): We forecast TD SYNNEX generating ~$1.5B of gross profit from hyperscalers in CY27 (~24% of total gross profit), on ~$19.8B of revenue (~22% of total). The exposure sits entirely within Hyve Solutions, its hyperscale infrastructure business, which operates more like an ODM/EMS partner to hyperscalers than SNX's traditional IT distribution business. Hyve designs and manufactures purpose-built servers, storage, networking and AI/rack-scale infrastructure, while also providing integration, deployment and supply-chain services. This gives SNX relatively direct exposure to hyperscaler data-center capex, with Hyve now participating in programs across all five major U.S. hyperscalers.

STX (OW) and WDC (OW): Management does not disclose revenue by customer type, but we estimate that roughly 60% of STX's and WDC's combined revenue is driven by US hyperscale customers. Assuming nearline pricing growth in the mid-20% range Y/Y, this implies ~$30B of hyperscale-related revenue for the two companies combined in CY27.

While Neoclouds are beginning to emerge as incremental HDD buyers, their contribution remains modest today. Given that major HDD vendors had little to no Neocloud purchase commitments a year ago, Neoclouds are largely limited to absorbing incremental exabyte output available in the market, which constrains their ability to become a more meaningful source of HDD demand in the near term.

Original Design Manufacturers (ODMs)

Howard Kao, Irene Yen

Translating hyperscaler capex to revenue in the ODM space

The conversion happens through the server line. For example, at Alphabet, about 60% of 2Q26 capex went into servers, with the remainder in data centers and networking. That server slice is what flows through Taiwan server ODMs, and their monthly sales reports are the first read on it.

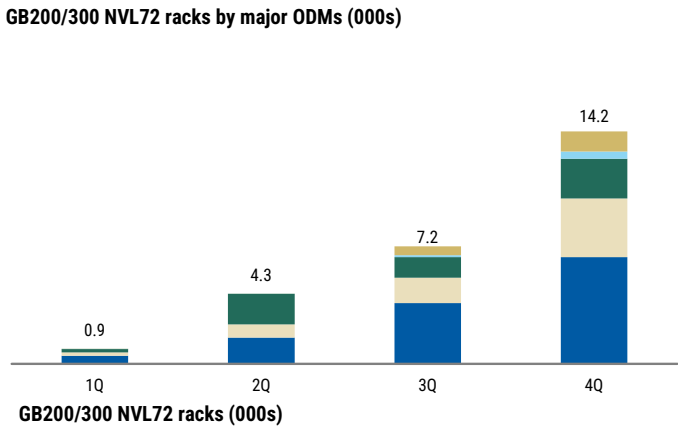
Reported ODM revenue includes the value of pass-through components such as GPUs, CPUs and memory. The value-add that actually accrues to the ODMs (assembly, integration, testing, procurement and working-capital support) is only a small fraction of the rack ASP, approximately in the mid single-digit range, though it is rising (in absolute dollar terms) with each new generation of AI server racks, due to increasing complexity. However, as rack BOM values rise, reported gross margin percentages can therefore compress even as absolute gross profit per rack increases.

Hon Hai: Cloud and networking made up 51% of 2Q26 sales, against 29% for consumer electronics. 2Q26 was the first quarter above half. Management guided AI rack shipments up a high double-digit percentage QoQ in 3Q and to more than double for the year. August 2026 sales rose 52% y/y to NT$921.8B (our report), with Cloud and Networking products seeing the strongest m/m growth. We model Hon Hai's GB rack shipments at 2.6K in August (+6% m/m). Beyond the racks, it expects revenue from 800G-plus switches to double in 2026, with CPO (co-packaged optics) switches moving into volume production in 3Q26.

Quanta: In 2Q26, servers were over 80% of sales, and AI is 75-80% of that line, guided to 80% for the full year of 2026; within AI servers, ASIC server contribution is still small at <10%. 2026 AI server revenue is still guided to double. GPU racks for neoclouds and ASIC racks are shipping in small numbers, and the big CSPs remain most of the book. Quanta expects to broaden its AI server customer base in 2027.

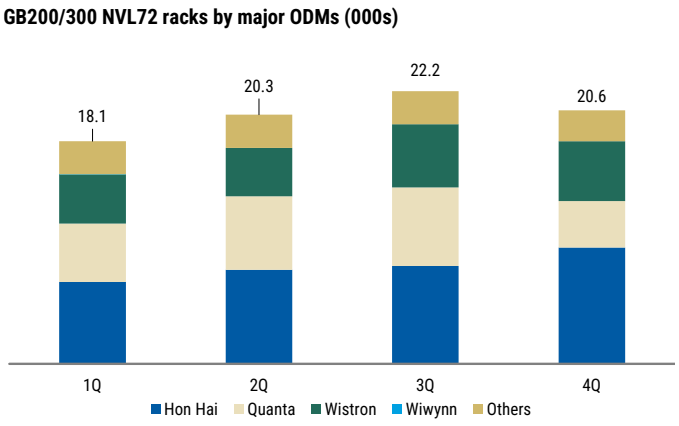
Wistron: AI is over 90% of Wistron's server revenue (excluding Wiwynn), and 2H AI shipments are expected to top 1H (report). Newly won enterprise and CSP accounts will both add to Wistron's AI server revenue in 4Q26. Its subsidiary Wiwynn carries most of the ASIC server exposure; we expect its shipments of key CSP customer's new-generation ASIC server racks to ramp from late 3Q26 and pick up more meaningfully from 4Q26 onwards (report).

Exhibit 26: Industry-wide GB200/300 NVL72-equivalent monthly rack output, by major ODMs (2025)



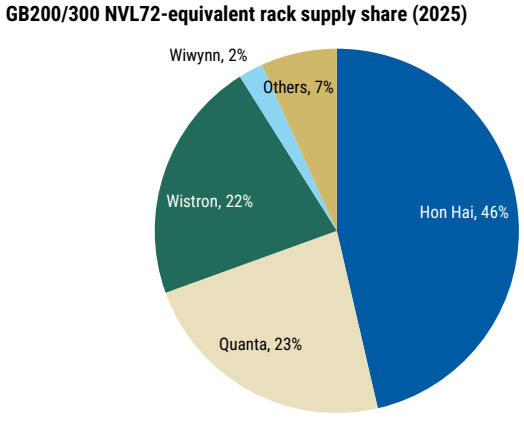
Source: Morgan Stanley Research estimates.

Exhibit 27: Industry-wide GB200/300 NVL72-equivalent monthly rack output, by major ODMs (2026)



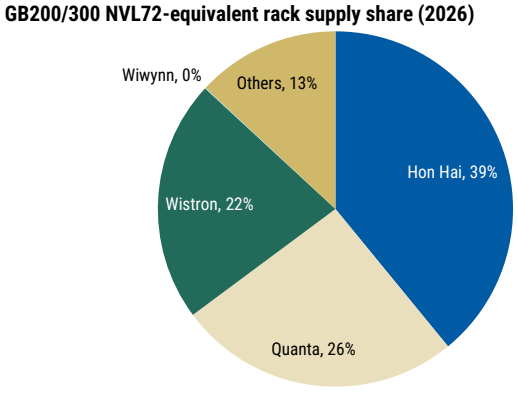
Source: Morgan Stanley Research estimates.

Exhibit 28: GB200/300 rack supply share, by major ODMs (2025)



Source: Morgan Stanley Research estimates.

Exhibit 29: GB200/300 rack supply share, by major ODMs (2026)



Source: Morgan Stanley Research estimates.

How would further capex revisions affect the Taiwan ODMs?

More of the recent raises (in the past ~6 months) reflect higher server prices due to higher component costs, rather than more volume. Amazon's CFO attributed most of the capex lift from US$200B to about US$220B for this year to rising memory costs, with no change to the build plan. Under a buy-and-sell model, the ODM buys the components and resells them in the rack to these CSPs. Memory then passes through ODM revenue at close to zero margin and ties up working capital. Under consignment, the customers are responsible for procuring and supplying those key components (CPU, GPU and memory) for themselves, so they drop out of ODM revenue.

However, the same capex revision lands differently on each name, because each ODM sells to different customers. Quanta and Hon Hai map most cleanly onto big-four CSP capex because their anchor AI server customers are Microsoft, AWS, Meta and Google. Hon Hai is also Oracle's key L10/L11 (system/rack-level) assembly partner and Nvidia's key AI server L6 (board-level) assembly partner. Wistron's CSP AI server exposure runs mostly through Nvidia as well AMD; it builds compute boards for both Nvidia and AMD's branded AI racks. Wiwynn is the general server assembly partners to Meta, Microsoft and AWS, and also the key (~80% share) rack assembly partner to AWS for its Trainium server racks.

Forward outlook

While downstream visibility into 2028 remains limited, we believe that is where the debate increasingly centers. Investors generally have little difficulty underwriting the strong CSP capex growth expected through 2027; rather, the key concern for downstream tech hardware investors is what happens in 2028. Consensus currently expects Big Four CSP capex growth to moderate from ~90% y/y this year to ~42% in 2027 and ~11% in 2028. This anticipated deceleration is one of the reasons ODMs trade at a lower 2027E P/E, below their 20-year average of 11.5x. That said, it is important to recognize that a meaningful portion of this year's capex increase reflects higher component costs rather than underlying server unit growth, which makes the headline capex growth rates less directly comparable across years.

Key investor debate & risks

- **Durability and funding:** Some hyperscalers have reported negative free cash flow as of 2Q26. Some investors asked whether 2028 turns into an air pocket once funding markets are saturated.
- **Value capture:** We model for ODMs' value-add per rack to rise 35-40% on VR200 vs. GB300, while the rack ASP almost doubles. The incremental bill-of-materials dollars are going to memory, GPUs, PCBs and capacitors. Some investors have raised concerns on declining AI server margins for ODMs, as ODMs' value-add per rack is not growing as fast as the rack ASP.
- **Consignment versus buy-and-sell:** Consignment lowers reported revenue, raises margins and lifts returns on capital for ODMs. How fast consignment spreads will decide whether 2027 revenue estimates hold. ODM investors generally prefer consignment models to buy-and-sell models, though absolute profit earned by ODMs is the same.

- **Balance sheet:** Working capital requirements rise alongside rack ASPs, prompting Quanta and Wistron to raise equity, while Hon Hai has primarily funded its expansion through direct borrowing. Although investors generally recognize that the high-ASP, capital-intensive nature of the AI server business requires additional funding, they tend to view the resulting equity dilution less favorably.
- **GPU versus ASIC:** Investors periodically question whether GPUs will ultimately displace ASICs, or vice versa. However, the broad consensus among ODMs and their customers is that GPUs and ASICs will coexist for the foreseeable future.

Multi-Industry

Toby Okwara

Where does hyperscaler capex flow within Multis?

Within our coverage, hyperscaler capex primarily flows to power/electrical equipment (VRT, ETN, FPS, HUBB) and cooling equipment (VRT, TT, JCI, CARR, ETN) suppliers, covering the grey and white space, from the grid to the chip. The product portfolio and history in data center differs across names, but each is seeing strong order and revenue growth as the build out progresses. Another consistent trend across the group is investment in modular. Each company has modular/prefabricated solutions to enable faster and simpler deployments amid increasing complexity and continued labor constraints in a market that values speed.

Exhibit 30: Power Management Exposure (MSe for F'27)

	Data Center Exposure	MV Transformer	MV Switchgear	UPS	PDU	Busway	RPP	Energy Storage	Electrical Components
Vertiv (VRT)	90%		X	X	X	X	X	X	X
Eaton (ETN)	33%*	X	X	X	X	X	X	X	X
Forgent (FPS)	65%	X	X		X		X		
Hubbell (HUBB)	8%				x				X
Trane (TT)	20%								
Johnson Controls (JCI)	20%								
Carrier (CARR)	12%								

Source: Company Documents, Morgan Stanley Research

*Eaton exposure based on pro forma revenue post Mobility spin targeted to close in 1Q27

Exhibit 31: Thermal Management Exposure (MSe for F'27)

	Data Center Exposure	Chiller	Air Handler	AC/Direct Expansion	CDU	Manifold	Cold Plates	Immersion Cooling
Vertiv (VRT)	90%	X	X	X	X	X	X	X
Eaton (ETN)	33%*				via Boyd	via Boyd	via Boyd	
Forgent (FPS)	65%							
Hubbell (HUBB)	8%							
Trane (TT)	20%	X	X	X	New			X
Johnson Controls (JCI)	20%	X	X	X	New			
Carrier (CARR)	12%	X	X	X	New			

Source: Company Documents, Morgan Stanley Research

*Eaton exposure based on pro forma revenue post Mobility spin targeted to close in 1Q27

Vertiv (VRT) (OW) is the most data center-exposed name in our coverage; **we estimate data center will account for ~90% of F'27 revenue** and estimate 30%+ of data center revenue is directly driven by hyperscaler capex. The remainder is indirectly supporting the hyperscalers through intermediaries. The business began with computer room air conditioning but has since expanded throughout the data center, covering the grey and white space, from the grid to the chip. The portfolio features **Power Management (35%)** - switchgear, UPS (uninterruptible power supply), PDU (power distribution unit), busway, RPP (remote power panel), energy storage; **Thermal Management (30%)** - CDUs (coolant distribution unit), manifolds, air conditioners/direct expansion, chillers, air handler, immersion cooling; **IT Systems (8%)** - racks, cabinets, white space integration; **Infrastructure Solutions (7%)** - enclosures, eHouses, modular structures; and **Services & Spares (20%)**. **Key prefab products are SmartRun**, a modular white space solutions, including power, cooling, and structures; and **OneCore**, a fully modular data center. Management guides revenue to grow at a 20-22% CAGR through 2030, driven by data center.

Eaton (ETN) is a market leading electrical equipment OEM **(transformers, switchgear, UPS, PDU, busway, RPP, energy storage, etc)**, selling into a range of end markets, including data center. In March 2026, Eaton completed its acquisition of Boyd (80%+ data center), adding liquid cooling to the portfolio, the **majority of which is cold plates, followed by CDUs, manifolds, and other components**. **We estimate data center will account for ~33%* of F'27 revenue, including ~7%* liquid cooling via Boyd**, and estimate ~50% of data center revenue is directly driven by hyperscaler capex (*based on pro forma revenue post Mobility spin targeted to close in 1Q27) and the remainder primarily sold through developers and other parties. The data center businesses has 50%+ growth y/y YTD, and management forecasts data center and distributed IT revenue to grow at a strong DD CAGR through 2030.

Forgent (FPS) (EW) is a pureplay electrical equipment OEM, primarily selling **transformers, switchgear, PDUs and enclosures into data center (MSe ~65% of F'27 revenue)**, as well as utility and industrial & other. The company was formed in 2023-24 through the acquisitions of 4 electrical equipment OEMs and went public in February 2026. The data center business grew 161% in F'26. Management guided total revenue to grow 76% in F'27, led by data center. FPS historically did not sell **directly** to hyperscalers, but the company recently won a hyperscale order, which they expect to deliver in F2H'27.

Hubbell (HUBB) (EW) provides a broad range of **electrical components (wiring devices, rough-in electrical products, connectors, grounding products, etc)** across a range of end markets, led by utility (60%). Excluding indirect exposure through the utility business, **we estimate data center will account for ~8% of F'27 revenue** and estimate ~50% of data center revenue is directly driven by hyperscaler capex. The business has grown 50% y/y YTD, and management expects this to hold in 2H and for data center to grow at a DD CAGR through 2027. We note that HUBB does not primarily sell directly to hyperscalers, but rather through EPCs, contractors, and distributors.

Trane (TT) (OW) is a leading thermal management solutions provider, including commercial HVAC (CHVAC), residential HVAC, and transport refrigeration. The data center business sits within CHVAC (~2/3 of revenue), specifically within applied CHVAC, which includes building controls and features more custom, integrated systems built for complex environments. The product portfolio primarily features **chillers, air handlers, and air conditioners/direct expansion, as well as CDUs**, launched in early 2025. **We estimate data center will account for ~20% of F'27 revenue** and estimate ~50% of data center revenue is directly driven by hyperscaler capex with the remainder being sold primarily through developers and other intermediaries. Applied HVAC is already up 40%+ YTD, led by data center, and management forecasts data center continuing to grow at a DD CAGR.

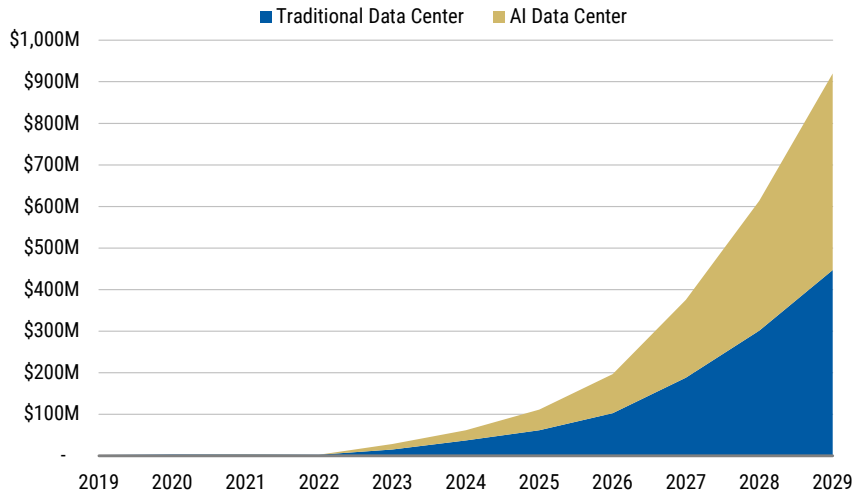
Johnson Controls (JCI) (OW) is a leading commercial building solutions provider, including **commercial HVAC (CHVAC), fire, security, and building controls**. The data center business spans the portfolio, but the key products sit within CHVAC, **chillers, air handlers, and air conditioners/direct expansion, as well as CDUs** which were launched in late 2025. **We estimate data center will account for ~20% of F'27 revenue** and estimate ~50% of data center revenue is directly driven by hyperscaler capex with the remainder indirectly supporting the hyperscalers. Management forecasts data center continuing to grow at a DD CAGR to reach ~33% of the portfolio in 3 to 5 years.

Carrier (CARR) (EW) is a leading thermal management solutions provider, including commercial HVAC (CHVAC), residential & light commercial HVAC, and transport refrigeration. The data center business sits within CHVAC (~1/3 of portfolio), specifically within applied CHVAC, which includes building controls and features more custom, integrated systems built for complex environments. The product portfolio primarily features **chillers, air handlers, and air conditioners/direct expansion, as well as CDUs,** launched in late 2025. **We estimate data center will account for ~12% of F'27 revenue** and estimate ~50% of data center revenue is directly driven by hyperscaler capex with the remainder sold indirectly through developers and others. The business grew 100% in 2025, and management expects another 100% in 2026, followed by at least 50%+ in 2027.

How would further hyperscaler capex revisions impact your space?

Upwards hyperscaler capex revisions would likely drive positive revenue revisions across the data center-exposed names in our coverage, particularly those most directly exposed to hyperscaler capex (VRT, ETN, TT, JCI, CARR). This would also likely drive accelerated capex investments. Supply is already constrained across our data center-exposed names, and each company is expanding capacity accordingly, with new projects announced across the group over the past year. A further acceleration in hyperscaler capex would likely drive incremental and accelerated capex among the suppliers to capitalize on this opportunity.

Exhibit 32: VRT Data Center Market Opportunity (MSe)



Source: Company Documents, Morgan Stanley Research

AI/Data Center Outlook

Across our coverage, data center revenue is expected to grow at a DD CAGR over the next 3-5 years. VRT, which is the best data center proxy in our coverage, provides the most color, forecasting its data center TAM to grow at an 18-20% CAGR between 2025-2030. This growth is led by cloud & colos (~60% of TAM) growing at a 23-25% CAGR, followed by enterprise & distributed IT (~40% of TAM) growing 6-8%. Forecasts from both VRT and ETN also point towards liquid cooling leading growth across the portfolio at a 30%+ CAGR.

At this point, the near term outlook is hard to question given recent order intake; backlogs across our data center names now cover the bulk of 2027, and pipeline commentary indicates durability through 2030. This is where the key debate is though: what happens in 2030. Backlogs typically stretch up 18 months, bringing greater uncertainty around 2030 spend. Bulls point to the volume of project announcements and positive pipeline commentary as supportive of durability into 2030 and potential upside, while bears note bottlenecks (power, labor, supply chain) and general uncertainty around projects yet to break ground as risks to the outlook.

Additional Key Debates:

i Is each company's offering differentiated, particularly CDUs? Or are solutions becoming commoditized?
ii Who will be the beneficiaries and who will be challenged on the transition to 800v DC architecture, and will the transition drive the $M/MW content opportunity up or down?
iii What is the long term opportunity for data centers in space? And, if successful, what does this mean for the existing data center infrastructure suppliers?

Key Risks:

i Execution risk on capacity expansion projects - We have already seen ETN and VRT run into challenges, and we see similar risk across the rest of the group
ii Disintermediation risk - Key customers may expand their portfolios into the products currently supplied by power and cooling OEMs, bringing risk to volumes and pricing power, and thus margins. This is especially pertinent for hyperscalers, who have a history of insourcing
iii Those winning on lead times, namely FPS, may lose share as competitors' new capacity comes online, lead times normalize, and supply and demand come back to balance.
iv Concerns on future chiller content. New generations of chips able to operate at hotter temperatures and liquid cooling efficiency continues to improve. This may lessen the demands placed on a chiller. Operators may not need to run chillers as hard or as often, which could lead to fewer chillers at the site (lower peak cooling capacity needed) and/or longer replacement cycles (lower daily usage)

Machinery & Construction

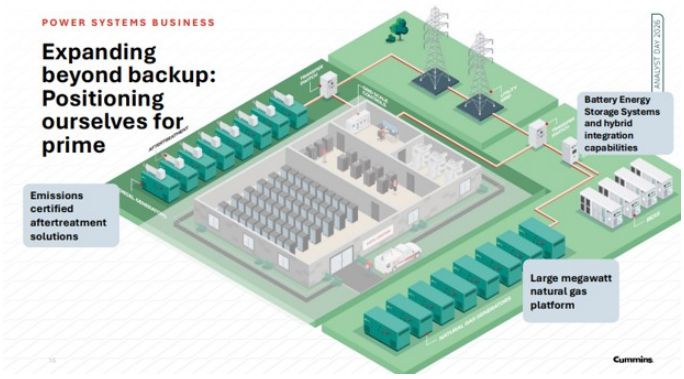
Angel Castillo, Stefan Diaz, Oliver Jiang

Across our US Machinery and Construction coverage, hyperscaler and neocloud capex translate most directly and expectedly in power generation. This applies to both traditional diesel backup power and prime/onsite generation, as grid availability remains a gating constraint on new data center capacity. We would rank EROC as the most levered to hyperscaler spending, as well as CMI and CAT. EROC is effectively a pure-play speed-to-power platform: its repackaged natural gas generators provide bridge power and, once grid-connected, can also provide dispatchable or backup power. CAT and CMI manufacture high speed recip engines used primarily in backup function and the mission-critical nature of diesel engines is well documented, as large-displacement engines are now sold out at least through 1H28. In addition, both OEMs also supply nat gas gensets, with CMI pursuing its development of a larger scale version of its existing solution. Due to its efficiency and emissions profile, these natural gas gensets are a preferred solution for continuous onsite generation when compared to diesel. Beyond engines, CAT's portfolio also includes Solar turbines offering 1MW - 38MW sizes, and has demonstrable use in a BTM data center arrangement.

There is also a meaningful second-order beneficiary set around constructing the data centers themselves. CAT, TEX, OSK, URI, DE, CNH and WSC all have construction equipment businesses that can participate in data center site development. Aggregates / concrete (VMC, MLM and CRH) are exposed to construction, as crushed stone and gravel are used in site grading and paving, and cement in building foundations and walls. Finally, Target Hospitality (TH) provides lodging and services to thousands of construction workers at remote hyperscale campuses, and is a clear beneficiary of both hyperscaler and AI-infrastructure spending. Thus, another round of upward AI-capex revisions would continue to deepen the impact to second-order beneficiaries in construction equipment and rental, aggregates and workforce infrastructure.

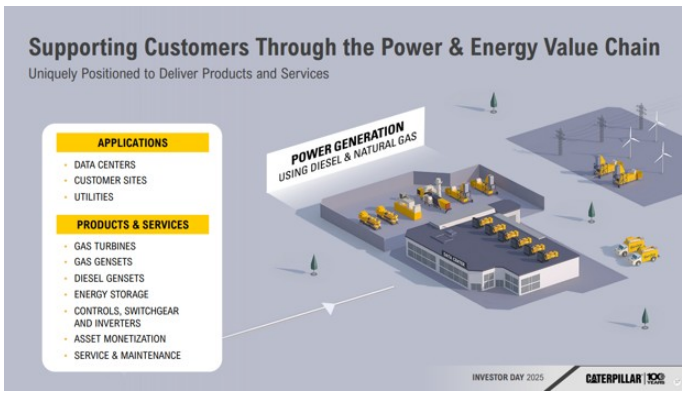
The key investor debates center on mix, capacity and the factors that may limit the pace of backlog conversion. 1) Onsite vs. Grid - each incremental project that leans toward onsite power (versus queuing up for a grid interconnect) should disproportionately benefit EROC and CAT because both offer gas-reciprocating solutions suitable for prime/ bridge applications. CMI remains heavily weighted toward backup today but is investing in its prime capabilities and expects to deliver a larger nat gas engine in 2028. **2) Return on incremental investment** - does the capacity expansion that has been announced at every engine OEM pay off beyond 2030, where visibility into hyperscaler spending growth is less clear. While we are of the view that hyperscalers and neoclouds are unlikely to grade-down on mission-critical equipment, less disciplined players on the margin have increased investor concerns over the impact of competition on pricing power from the Tier 1 incumbents like CAT and CMI. **3) Project conversion** - labor availability, permitting and inflation can all slow the pace at which announced data center projects move into active construction and ultimately convert into orders for rental companies, power OEMs and aggregates producers. We continue to see evidence of tight specialty labor markets, but overall view backlog conversion as a function of timing rather than spending level.

Exhibit 33: CMI is developing a large MW natural gas platform that is slated to enter limited production in 2H28



Source: Cummins Investor Day 2026

Exhibit 34: CAT designs and manufactures industrial gas turbines in its wholly-owned subsidiary Solar Turbines



Source: Caterpillar Investor Day 2025

Power

David Arcaro, Jeremy Herring

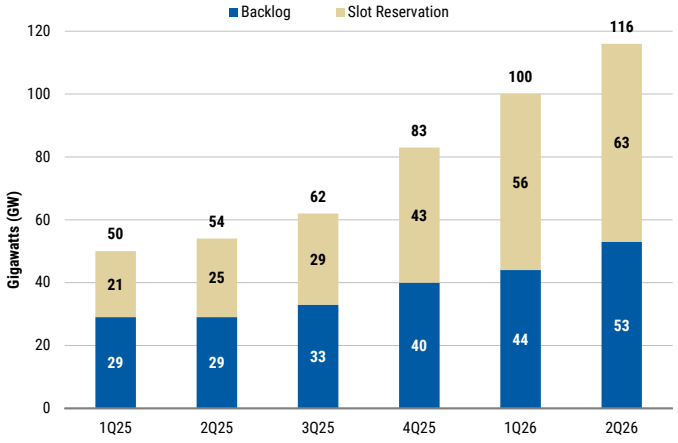
Across our coverage hyperscaler capital expenditure is most directly spent on power and electrification equipment, including turbines, fuel cells, transformers and switchgear, namely from GEV, BE and INIO. An important asterisk in this conversation is that while within data center spend power makes up 10-20% of the cost stack, this spend can take the form of opex to utilities, IPPs or onsite power providers over the life of a power purchase agreement (PPA). That said, hyperscalers have shown that they are willing to utilize their balance sheets to place orders directly with OEMs for long lead items and support their power developers as order deposits can be as much as 20-40% of the total purchase price for equipment deliveries 5 years ahead.

GE Vernova (GEV) offers the most full scope solution for data centers amongst its clean tech peers through its Power and Electrification segments. The company's gas turbines, a primary electricity generation source, are now sold out through 2029 and have increased in price to $3,000/kW from $1,000/kW for projects in the early 2020s. **While utilities and IPPs have been GEV's historical legacy customers, management has noted that data center orders now make up ⅓ of its pipeline and 10-15% of its gas power backlog.** Though this is not an apples-to-apples comparison to hyperscaler capex as power developers may be placing orders directly with GEV for a hyperscaler end-customer.

- DUK has secured 26 gas turbines through GEV partnership agreement.
- ETR has secured 24 GW of gas turbines with Mitsubishi.
- XEL has secured 24 gas turbines through Siemens and GEV for delivery over the next 5 years.

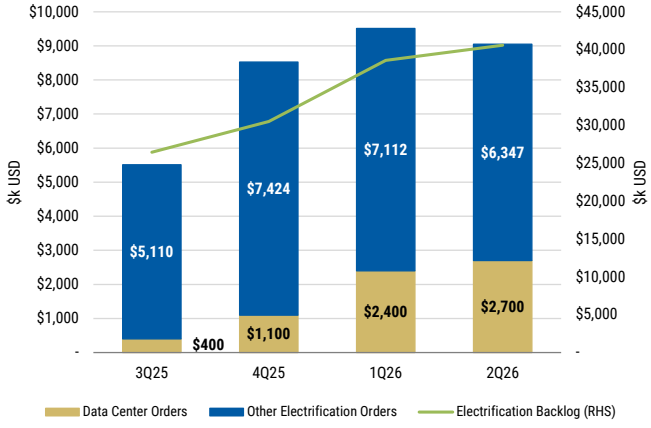
Beyond power, GEV has a suite of electrical solutions that include transformers, switchgear, MW UPS, software and SSTs in the near future. **Data center orders have grown substantially over the past four quarters and GEV's data center entitlement has now grown to $400-500m/GW with new product introductions, up from $200-300m/GW.**

Exhibit 35: GEV Gas Turbine Commitments



Source: Company data, Morgan Stanley Research

Exhibit 36: GEV Electrification Backlog



Source: Company data, Morgan Stanley Research

When we think about the upside opportunity from higher capex revisions we think that the most direct impact would be for OEM backlogs to extend out even further at higher margin. **Put simply, more data centers would need more power and we are already beginning to see this flow through.** We hosted a number of management teams at our Laguna Industrial's conference recently and we came away even more bullish than before about the long-tailed secular opportunity for OEMs selling into data center end-markets (read our takeaways here). Developers are now ordering equipment further out to ensure that they will have power and have shown an insensitivity to higher prices as they lock in capacity.

The 2030 debate. The market was been grappling with the durability of the cycle as OEMs have begun to book orders as far out as 2032 now. Furthermore, the competitive landscape has undergone a structural shift whereby new entrants and the capacity expansions are pushing the industry towards ~150 GW of annual capacity (vs ~50 GW in 2024). This raises the question of oversupply and potential profitability compression. To that end, we are of the view that there will be a flight to quality tier-one suppliers including GEV, INIO and BE to support the buildout of data centers globally. We'd expect technologically advantaged assets like large-scale heavy-duty turbines, high speed reciprocating engines and fuel cells to win out demand.

Where would we be more concerned in a slowdown? Power OEMs are now requiring deposits of 20–40% for turbines and engines, with order books largely filled through 2028 and new orders being placed as far out as 2032. However, should the industry experience a demand downturn driven by reduced hyperscaler and utility capex, we would expect pricing to soften and manufacturing utilization rates to decline. Within the industry, we believe backlogs at established Tier 1 manufacturers of larger-frame equipment (GEV and peers) are the most de-risked, while newer entrants and smaller equipment manufacturers face the greatest risk of order cancellations.

Credit Markets Broadly Will Be Critical to Financing AI Capex

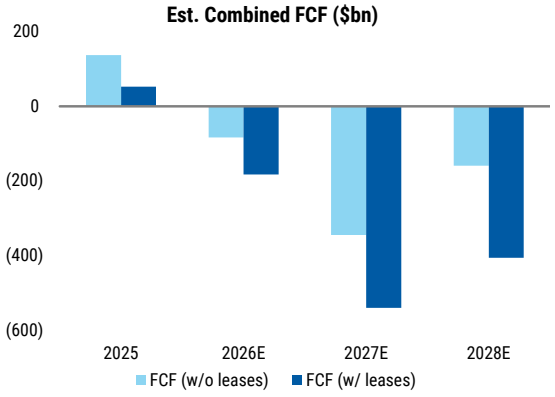
Fernanda Lima, Vishwas Patkar

Financing needs are likely to increase in 2027 and access to capital will differ across the AI ecosystem. We continue to see capacity for the higher-rated hyperscalers to fund their investment plans, even at higher borrowing costs. The greater constraint is likely to be further down the credit spectrum, where thinner cash-flow cushion is more sensitive to higher financing costs. As investment shifts toward chips, servers and leased assets, the funding mix should evolve as well.

We expect financing needs to increase materially in 2027 as capex increases and free cash flow turns substantially more negative. Our estimates show cash from operations falling further short of capex, with 2027 marking the largest cash-flow deficit in our forecast horizon (Exhibit 37). The shortfall is even greater on our measure that additionally deducts operating lease payments. Attractive expected returns support the case for continued investment, but do not eliminate the need to fund the gap between spending today and cash generation over time. We therefore expect debt financing to play a larger role next year.

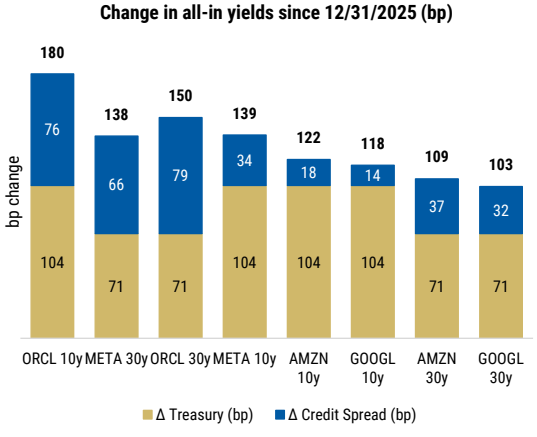
This comes after an already substantial increase in borrowing. Hyperscalers have issued roughly $255bn of unsecured bonds across currencies year to date, equivalent to around 30% of their estimated full-year 2026 capex (Exhibit 39). Credit markets have already become an important source of capital for the buildout, and with the cash-flow deficit widening next year, we expect even more reliance on external funding sources. Access to credit markets and ability to absorb higher interest rates are fundamental for hyperscalers and neoclouds to be able to deliver against our capex estimates. Companies driving the ongoing investment cycle fall into different buckets when it comes to credit quality, and they're also dependent on different markets for funding.

Exhibit 37: We expect to see peak negative FCF in 2027



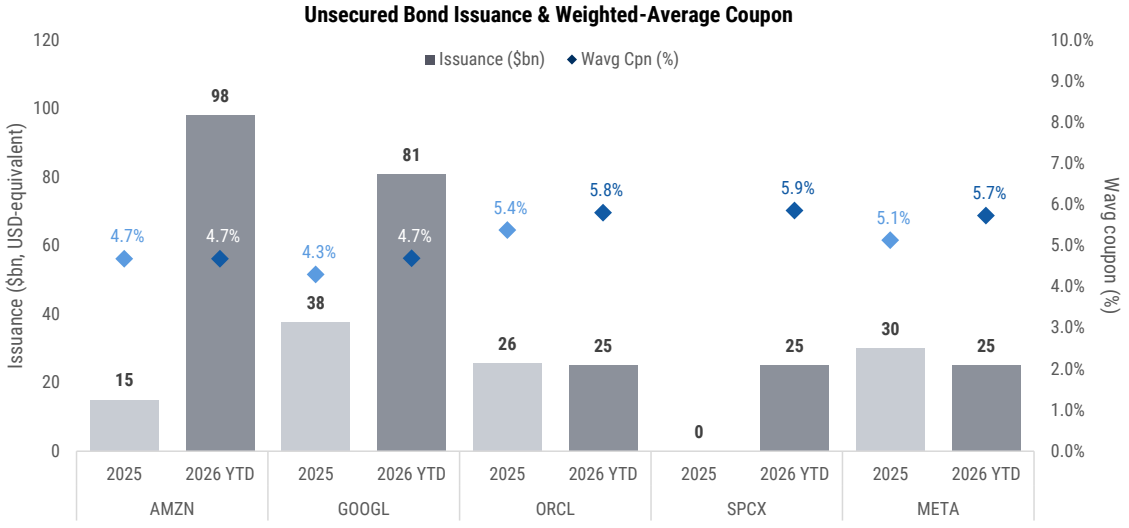
Source: Company filings, Morgan Stanley Research estimates. We calculate FCF as net cash from ops less capex (and include lease payments for the darker blue columns).

Exhibit 38: All-in yields are 180-100bp higher for hyperscalers



Source: Bloomberg, Morgan Stanley Research. OAS for credit spread; change calculated between 12/31/25 and 10/13/26.

Exhibit 39:
Hyperscalers issued ~$255bn of unsecured bonds YTD despite an increase in treasury benchmarks and wider credit spreads



Source: Company filings, Bloomberg. We include total unsecured bond issuance for each of these names, in USD and other currencies.

High-quality hyperscalers (rated AA or higher) are mostly price insensitive to higher interest rates, in our view. Debt issuance increased significantly in 2026 (Exhibit 39) even with all-in spreads for existing bonds issued in 2025 now ~120bp wider for names like AMZN and GOOGL, with the move in treasury benchmarks representing ~80-70% of the total move (Exhibit 38). While expected high ROIC is an important factor for hyperscalers to continue to issue debt even when treasury benchmark is higher and credit spreads widened, it isn't the only one: we find that **this cohort is starting off from a high interest coverage ratio of >30x** and therefore could shoulder higher rates while still maintaining high-quality credit metrics (the median interest coverage for companies in the IG index is ~11x, see slide 3 here). Our illustrative exercise in Exhibit 40 has conservative assumptions: we calculate coverage based on operating income (instead of EBITDA) and we assume no growth for such metric between 2026 and 2027.

Financing is a more meaningful constraint further down the credit spectrum. While **lower-rated hyperscalers** could also benefit from elevated returns on invested capital, these companies are starting off with significantly less cushion in credit metrics like leverage and interest coverage. At the same time maintaining access to the IG credit market is key to finance the buildout, not only because of lower

Exhibit 40: Illustrative funding assumptions show greater interest-coverage headroom for HQ Hyperscalers

Combined Metrics	HQ Hyperscalers	LQ Hyperscalers
2026 Operating Income ($mn)	546,341	33,357
2026 Interest Expense ($mn)	17,770	8,360
2026 Coverage (x)	***30.7x***	***4.0x***
2027 PF Interest Expense ($mn)	45,770	18,560
2027 PF Coverage (x)	***11.9x***	***1.8x***

Source: Morgan Stanley Research Estimates. For 2027 PF Interest Expense, we assume HQ hyperscalers (AMZN, META, GOOGL, MSFT) issue $400bn of unsecured bonds in 2027 at 7%, and for LQ hyperscalers (ORCL, SPCX), we assume $120bn of unsecured bond issuance at 8.5%. This is a theoretical exercise and not our formal issuance estimate for 2027. We calculate 2027 PF coverage using 2026 operating income, assuming no growth to be conservative.

cost of capital but also because this is a market that rarely shuts down (while the HY market might have specific windows when it shuts down due to economic conditions).

For **data-center developers**, higher debt costs can also directly reduce project returns, potentially requiring higher lease payments from customers, additional equity or stronger credit support before financing can proceed. **We therefore distinguish between aggregate capital availability and the ability of individual borrowers to access that capital on workable terms.** The latter remains an important condition for delivering the capex estimates presented in this report. We recommend our detailed work on the impact of higher rates for data center developers: Data Center Financing: Funding Stabilized Assets in a Higher Rate Environment (24 Sep 2026).

Neoclouds have primarily relied on asset-level financing and convertible bonds for funding, and are the most sensitive companies to higher cost of debt. These companies are generally new to both credit and equity markets, and therefore are still building a track record and are almost fully relying on debt issuance to fund its capex ambitions. We expect credit support mechanisms from higher-rated counterparts to facilitate access to capital for these companies.

As we start to think about how 2027 supply might look like, the composition of spending matters as much as the headline capex number. Semiconductors and servers account for roughly 40% of the investment mapped in Exhibit 1 , with additional related spending captured among international suppliers. Given the move towards assets with shorter useful lives, but faster path to cash flow generation, **we expect the 2027 issuance mix to skew more toward**:

- **Unsecured paper with lower proportion of long-duration bonds than this year**: Given previous discussions on how chips have a faster path to cash flow generation vs. powered shells, we think issuers could look into doing more short-term issuance vs. what we've seen throughout 2026, which is concentrated in the 30y part of the curve (refer to our AI Financing tracker for more details).
- **Asset-backed financing (borrowing backed by specific equipment) and private capital**: In our view, chips lend themselves to shorter-duration, amortizing structures, with greater flexibility to tie financing to contracted demand. That should create more opportunities for chip-backed bonds and loans alongside private placements, particularly where customer contracts match or exceed the tenor of the associated debt.

Despite a potential different mix vs. 2026, we expect supply to remain fairly concentrated in the US IG market. The US investment-grade market should remain a major funding source given its size and depth (~$10tr, with inflows YTD at >$100bn; see slide 18 here). High-quality suppliers should also play a larger role in enabling 2027 debt supply, as semiconductor companies can support investment in their products without providing all the funding themselves. Such arrangements can broaden access to capital, although some of the credit exposure remains linked to the companies providing that support. Issuance from Utilities around capex tied to energy asset solutions could also be topical given the power shortfall that is likely to emerge in the coming years.

Risks

Risks to Upside

Underappreciated Compute Demand: Capex estimates have consistently moved higher over the past few years, and history suggests we are likely still too conservative (Exhibit 41). Wall Street has underestimated secular compute cycles by an average of 38%. This risk is well documented across various notes (here, here, and here) but is worth flagging again at a high level in the context of the AI compute cycle.

Bottlenecks: Bottlenecks have been a key driver of stock price action, whether in GPUs, CPUs, memory, or elsewhere. Near-term risk centers on power shell buildouts and skilled labor availability, while longer-term risk shifts toward grid access and behind-the-meter power solutions. We expect bottlenecks to persist as the race to build data centers continues, with willingness to pay hinging heavily on time-to-market. An acceleration in hyperscaler and neocloud capex from current levels, or a shift in priorities among incumbent players, could put acute pressure on specific pockets of the supply chain. This can create both outsized pricing pressure for incumbent companies and create market volatility overall from the ripple effects. See Exhibit 7 for companies best positioned in bottleneck scenario.

Faster Adoption: We think 2027 will be a key year for the Adopters and AI provides incredible productivity opportunity for the average person, not just power users. We expect both corporate and personal use of AI to accelerate but with new AI models and products coming out each month, it's possible adoption drives an even greater opportunity than expected. Our work already has shown that forward margin expectations are improving most clearly for companies with strong AI adoption and high pricing power. We believe more companies will look to emulate this impact for investors by internally promoting AI usage and externally advertising the impact.

Exhibit 41: Wall Street Underestimates Compute Cycles by Almost 40% Historically



Source: Morgan Stanley Research

Risks to Downside

AI Policy Pressures

Ariana Salvatore

We've flagged people, power, and politics as the main constraints to the AI infrastructure story. Political pushback, to be sure, has become the wedge issue in the midterm elections, which we think can present a catalyst with respect to this issue and broader AI sentiment (see here: US Public Policy: Four Takeaways for the Midterm Elections).

We think the midterms will be critical not for the immediate risk of federal policy restricting data centers but to lay the groundwork for potential legislation toward that end in 2029. At the same time, state and local policy efforts to restrict DC construction could be relevant for federal policy accomplishing the same thing in 2029 and beyond. Given that we frame data center restrictions as a primarily incumbent vs. non-incumbent issue (i.e. non-incumbent candidates in key races are proposing more stringent restrictions), we think sentiment is likely most constructive under a Republican sweep vis-a-vis the expectation for fewer restrictions and regulatory constraints, broadly neutral under a divided government, and least constructive under a Democratic sweep.

As we note elsewhere in this report, our base case is a conditional buildout (i.e. preserving the expected levels of capex but only in certain regions contingent upon community engagement or other mitigation measures). We don't expect a federal pause, given the national-security framing and likely Presidential veto of restrictive legislation at the national level. We see the binding levers to data center construction as primarily state and local (interconnection, large-load rate design, siting, permitting and the abatements themselves), which is why governors and utility commissions matter more than Senate races. Most candidates have converged on restrictions, with the argument now pause versus conditions, and tax breaks are the consensus target regardless of who wins. Sentiment in this context we think is most positive in a Republican sweep given the expectation that non-incumbents are typically proposing more restrictive policies, neutral under divided government, and weakest in a Democratic sweep.

Accordingly, we summarize key races to watch alongside the areas where we see the largest potential for policy shifts following November, with a few key observations:

- Governors are relevant for their ability (in most states) to appoint regulators, as well as sign tax and siting laws from the legislature. Elected utility commissions are the direct rate and tariff lever. That means they hold broader, but softer, power (via directives and regulatory appointments primarily). Commissions decide the dockets that set cost allocation and approve generation, and those are legally durable. Local governments via legislatures are slowest but the bodies that can make any of these restrictions more permanent.
- Most candidates have converged on restrictions to some extent, but the remaining argument is whether to pause development outright or allow it to proceed subject to specific conditions. No major candidate in these races is running as pro-data-center without qualifiers.
- Tax breaks appear to be the consensus target, regardless of who wins: Abbott, Tiffany, Ford, Nesbitt and Georgia Republicans have all called for repeal or rollback, and Arizona already paused its exemption through June 2029.

Exhibit 42: Key races to monitor, where the elections could lead to more restrictions on data center construction

Governor Races				Total	Under Construction	Planned	Land Acquired	Total	Under Construction	Planned	Land Acquired	
TX Governor	Abbott (R): halted new approvals pending a PUCT/ERCOT audit of ~250–300 projects; wants the sales-tax break eliminated	Hinojosa (D): full moratorium by emergency EO plus a special session; says Abbott's pause "goes away on November 4th"	Governor appoints PUCT; pause is administrative, but could be codified by legislature (unlikely)	24.0	5.2	11.6	7.1	159	46	92	21	Google, Meta, Amazon, Microsoft, Digital Realty, Cipher, Equinix
OH Governor (open)	Ramaswamy (R): day-one EO halting approvals until projects bring own power and forgo abatements	Acton (D): conditional moratorium: 100% of utility costs, brownfields only, union labor, no local NDAs	Governor appoints all 5 PUCO members	6.4	1.9	3.9	0.6	67	26	32	9	Amazon, Microsoft, Google, Meta, MARA, Cipher, Nvidia/Softbank/LLM provider
PA Governor	Shapiro (D): EO requires consent orders covering electricity costs and local approval; bars fast-track permitting	Garrity (R): calls for a pause, though endorsed by President Trump	Both candidates propose restrictive policies, the key difference is pause vs. conditions	11.3	0.4	10.9	0.0	66	6	60	0	Amazon, Nebius
GA Governor	Jackson (R): no freeze; "no new data center should be approved unless the local community supports it"	Bottoms (D): immediate statewide freeze on new construction	Tax policy and preemption only; PSC is elected	2.9	0.9	2.1	0.0	58	15	43	0	Digital Realty, Meta, Microsoft, Amazon, Google
NV Governor	Lombardo (R): "the new gold rush"; backed a gas pipeline to TRIC; reviewing the abatement structure	Ford (D): pause new tax breaks, audit existing, ban evaporative cooling, end federal-land siting	Governor appoints PUCN	2.3	0.5	1.7	0.0	27	9	18	0	Google, Apple, Microsoft
WI Governor (open)	Crowley (D): 100% new clean generation, no cost shift, local approval/reject authority	Tiffany (R): repeal tax breaks, bar farmland siting, keep coal online	Neither backs a moratorium	3.3	1.5	1.8	0.0	14	7	7	0	Microsoft, Meta, Oracle/Vantage/LLM provider
MI Governor (open)	Benson (D): statewide guardrails plus a moratorium "to protect every community," public portal, union contracts	James (R): Lansing shouldn't dictate to localities; incentives tied to measurable public benefit	Appoints MPSC	1.4	0.5	0.9	0.0	4	2	2	0	Oracle/Related Digital/LLM provider
Elected Utility Commissions												
GA PSC District 3 (statewide)	Hubbard (D): one of two Democrats who flipped in 2025, pushing to revisit the grid expansion	Fitz Johnson (R): former commissioner; voted for the expansion and DC contract terms; won primary 50.2%	3-2 GOP majority flips if Dems win both seats	2.9	0.9	2.1	0.0	58	15	43	0	Digital Realty, Meta, Microsoft, Amazon, Google
GA PSC District 5 (open; statewide)	Tolbert (R): "pro-data center" but worried Georgia Power is overbuilding	Edwards (D): data centers "must pay the full cost of the infrastructure needed to serve them"	Same as above	2.9	0.9	2.1	0.0	58	15	43	0	Digital Realty, Meta, Microsoft, Amazon, Google
AZ Corporation Commission (2 seats, statewide)	Thompson (R): "growth pays for growth"; Heap (R) beat incumbent Myers	Pratte (D), Hill (D); Hill floats pausing development	Decides APS's (Arizona Public Service) 14% electricity rate increase request, including proposed 45% large-load hike for energy users like DCs	2.8	0.8	1.9	0.1	62	15	45	2	Google, Amazon, Microsoft
LA PSC District 1 & 5 (both open)	Hilferty (R, D1): ratepayers shouldn't fund DC generation. Atkins (R, D5)	Norris (D, D1) + Justin (I); Green (D, D5)	Vote on ~$15B of Entergy gas units for Meta's Richland Parish expansion lands around the election	4.1	1.6	2.5	0.0	14	7	7	0	Meta, Hut 8, Amazon, Applied Digital
State Legislature	**Status**	**Relevance**										
House and Senate races in PA, AZ, WI, MI, MN, OH, TX	Toss-ups	Tax breaks, large-load tariff statutes, repeal of DC tax incentives, sales-tax waiver (in MI), codifying governor package (in TX)		50.8	10.6	32.4	7.9	385	105	248	32	Google, Meta, Amazon, Microsoft, Digital Realty, Cipher, Equinix, MARA, Nebius, Nvidia, Oracle

Source: Various news sources, campaign statements, Morgan Stanley Research,. Note: Abbott (R), Hinojosa (D), Ramaswamy (R), Acton (D), Shapiro (D), Garrity (R), Jackson (R), Bottoms (D), Lombardo (R), Ford (D), Crowley (D), Tiffany (R), Benson (D), James (R), Hubbard (D), Fitz Johnson (R), Tolbert (R), Edwards (D), Thompson (R), Pratte (D), Hill (D), Hilferty (R, D1), Atkins (R, D5), Norris (D, D1), Justin (I), Green (D, D5)

In the meantime, we see mitigation efforts underway, which is part of the reason we remain constructive on the buildout: we don't see a one-size-fits-all response, as efforts are mirroring the three constraints we outline here: 1) higher electricity prices: a number of hyperscalers signed the Ratepayer Protection Pledge (promises to build/buy their own generation, cover grid upgrade costs, and pay separate large-load rates whether or not they use the power). 2) Environmental concerns: Google has committed to returning more water to local systems than its data centers use by 2030 and Amazon disclosed global data center water use for the first time this year. 3) Quality of life: Meta launched a $1bn fund for host-community teachers, first responders, and infrastructure.

For more context on the AI power pushback, see Power Struggle: Data Center Pushback Update & Expert Call Takeaways.

Volume and Price - A Compounding Risk

The risk facing AI infrastructure spending is a classic macroeconomic supply-and-demand problem. Scarcity today drives the "fear of missing procurement" dynamic but allows for suppliers to margin stack on the scarcity. The cycle works in that buyers assume tomorrow's compute will cost more, so they pay up now, which is why volume growth and pricing power have reinforced each other. But supply shocks resolve the same way they always do: once capacity catches up or demand normalizes, the same forward-buying and urgency that inflated prices work in reverse, collapsing pricing power just as suppliers are stuck holding high-cost inventory. It's the standard capital-cycle playbook, just compressed by how concentrated the hyperscaler customer base is.

Layered on top is a longer-running compute pattern: Moore's Law pushes the cost of compute down while Jevons paradox pushes total consumption up, so cycles tend to see volumes rise structurally even as unit prices fall. The late 2022 memory downturn is a useful analog — NAND shipments fell only ~5% while prices fell 20-30%, cutting supplier margins far faster than volume alone implied. Applied to today's AI buildout, even a plateau (not a collapse) in hyperscaler and neocloud capex could leave volumes resilient thanks to Jevons-style demand rebound, while pricing power and upstream margins still evaporate quickly — just as they did for memory and equipment makers before. Put more simply, demand swings amplified by shortages can cut both ways and historically Wall Street is underprepared for the depth of cuts to the downside. We think the risk of both volumes and price falling at the same time is underappreciated in the current market.

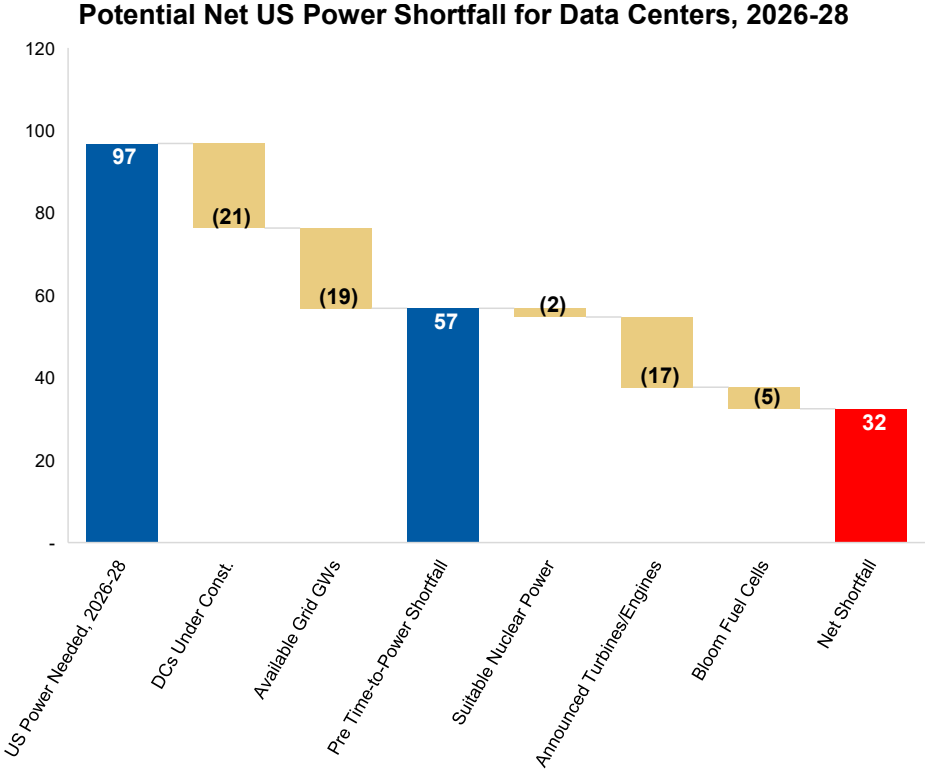
Power Bottleneck

There are a multitude of risks that could delay or derail AI capex spending around a more efficient model breakthrough, falling token cost, or bottlenecks. The most tangible risk that we see now is a power bottleneck as discussed in Powering AI: Racking Up the Power Shortfall.

Our 2027 capex estimate of $1.6T assumes every chip ordered gets powered and put to work. Morgan Stanley's Powering AI model suggests that may not hold: after time-to-power solutions, it still sees a 32 GW net US shortfall through 2028 (34% of the 97 GW needed), and about 72 GW through 2029. If energized capacity falls short of chip deliveries, the spending risk is a mismatch in timing rather than a collapse in demand. Hyperscalers can keep buying scarce GPUs ahead of power, which would hold up near-term chip revenue and could produce hoarding and stranded inventory. But buying power-dependent equipment that cannot be turned on is hard to sustain. Rack-scale systems concentrate far more load, and the value of a delayed deployment is high, so slippage in energization would eventually force orders to be pushed out or redirected.

The risk is uneven across the supply chain. Components that ship with the rack and are bought ahead of need (memory, networking, optical, ODM server builds) are most exposed to a pause once customers hit a power wall, and memory is the most sensitive because the recent capex increase is partly price rather than volume. Industrial and shell names such as electrical, cooling and construction equipment depend on projects actually getting built and energized, so slower interconnection would show up as backlog conversion delays rather than cancelled demand. Power-solution providers (BTM generation, fuel cells, powered shell) would be relative beneficiaries, which is the other side of the same constraint. Capex could also shift abroad, since the Powering AI note expects hyperscalers to build more outside the US if domestic power stays tight. The power gap is a plausible catalyst to relieve bottlenecks in other key pockets which could spread out volumes over a less condensed time line and dial back pricing power.

Exhibit 43: Net of "time to power" solutions, we project that US data center developers will experience a 32 gigawatt shortfall through 2028 - this is a result of intensifying challenges with respect to People, Power and Politics



Source: Morgan Stanley Research

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Technologies Inc, Oracle Corporation, Oshkosh Corp, Otis Worldwide Corp, PagerDuty, Inc., Palantir Technologies Inc., Palo Alto Networks Inc, Parker-Hannifin Corp, PDF Solutions Inc, Pegatron Corporation, Peloton Interactive, Inc., PG&E Corp, Pinnacle West Capital Corp, Pinterest Inc, Playtika Holding Corp, Plug Power Inc., PPL Corp, Public Service Enterprise Group Inc, Q Technology (Group) Company Ltd, Qualcomm Inc., Qualys Inc, Quanta Computer Inc., Quantinuum, QXO Inc, Ralliant Corporation, Rapid7 Inc, Reddit Inc, Resideo Technologies Inc, Revolve Group Inc, RingCentral Inc, Roblox Corporation, Rockwell Automation, SailPoint Inc, Salesforce, Inc., Samsara Inc, Samsung Electronics, SanDisk Corporation., Seagate Technology, Sempra, Semtech Corp., SentinelOne, Inc., ServiceNow Inc, ServiceTitan Inc, Shanghai Conant Optical Co Ltd, Shenzhen Transsion Holdings Co Ltd, Shopify Inc, Siemens, Silicon Laboratories Inc., SiTime Corporation, SK hynix, SK Square Co Ltd., Skyworks Solutions Inc, SmartRent, Inc., Snap Inc., Snowflake Inc., Soitec SA, Solaredge Technologies Inc, Solaris Energy Infrastructure, Sonos Inc., Southern Company, SpaceX, Spire Inc, Sprinklr Inc, Sprout Social Inc, SPS Commerce Inc, Stanley Black & Decker Inc, STMicroelectronics NV, Sunrun Inc, Suzhou TFC Optical Communication Co Ltd., Synopsys Inc., Take-Two Interactive Software, Talen Energy Corp, Target Hospitality Corp., TCL Corp., Tenable Holdings Inc, Teradata, Terex Corp., Texas Instruments, Timken Co, Toast, Inc., Trade Desk Inc, Trane Technologies PLC, TSMC, Twilio Inc, Uber Technologies Inc, UiPath Inc, Unimicron, United Rentals Inc., Unity Software Inc, Varonis Systems, Inc., VAT Group AG, Vertex Inc., Vertiv Holdings Co., Via Transportation Inc, Vistra Corp, W.W. Grainger Inc., Webtoon Entertainment Inc, Western Digital, Westinghouse Air Brake Technologies Corp, WillScot Holdings Corporation, Wistron Corporation, Wiwynn Corp, Wix.Com Ltd, Wolfspeed, INC, Workday Inc, X-Energy Inc., Xanadu Quantum Technologies Limited, Xcel Energy Inc, Xiaomi Corp, Yageo Corp., Yangtze Optical Fibre and Cable JSC Ltd, Yelp Inc, Zebra Technologies Corporation, Zeta Global Holdings Corp, Zhen Ding, Zhongji Innolight Co Ltd, Zillow Group Inc, Zoom Communications, Zscaler Inc.

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Morgan Stanley & Co. LLC makes a market in the securities of Acuity Inc., Aeva Technologies Inc, AGCO Corp, Allegion Public Limited Company, Allison Transmission Holdings Inc, Ameren Corp, Ametek Inc., Amplitude Inc., Appian Corp, Array Technologies Inc, Asana Inc, Atmos Energy Corp., Autodesk, Axon Enterprise Inc, Blackline Inc, Box Inc, C3.ai, CCC Intelligent Solutions Holdings Inc, Check Point Software Technologies Ltd., Consolidated Edison Inc, Donaldson Company Inc., DoubleVerify Holdings Inc, Dover Corp, DTE Energy Co., Edison International, Elastic NV, EMCOR Group Inc., Emerson Electric Co, Eversource Energy, FIGS, Inc., Five9 Inc, Fortive Corp, Garmin Ltd, Gates Industrial Corporation PLC, GoDaddy Inc, Grindr Inc., Hubbell Inc., IDACORP Inc, Johnson Controls International Plc, Kennametal Inc., Keysight Technologies Inc, Lennox International Inc, Lincoln Electric Holdings Inc, Liveramp Holdings Inc, Manhattan Associates Inc., Martin Marietta Materials Inc, MasTec, Inc., MGE Energy, Inc., MNTN Inc, Motorola Solutions Inc, NICE Ltd., OGE Energy Corp, ONE Gas Inc, Oshkosh Corp, PagerDuty, Inc., Parker-Hannifin Corp, PDF Solutions Inc, Pinnacle West Capital Corp, Playtika Holding Corp, Public Service Enterprise Group Inc, Qualys Inc, Rapid7 Inc, Resideo Technologies Inc, Revolve Group Inc, RingCentral Inc, Rockwell Automation, Shoals Technologies Group, Solaris Energy Infrastructure, Sonos Inc., Spire Inc, Sprinklr Inc, Sprout Social Inc, SPS Commerce Inc, Stanley Black & Decker Inc, Talen Energy Corp, Target Hospitality Corp., TD Synnex Corporation, Teledyne Technologies Inc., Teradata, Terex Corp., Timken Co, Trane Technologies PLC, Varonis Systems, Inc., Vertex Inc., Vulcan Materials Company, W.W. Grainger Inc., Watsco Inc, Webtoon Entertainment Inc, Westinghouse Air Brake Technologies Corp, Wix.Com Ltd, Yelp Inc, Zebra Technologies Corporation, Zillow Group Inc, ZoomInfo Technologies Inc.

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Certain disclosures listed above are also for compliance with applicable regulations in non-US jurisdictions.

STOCK RATINGS

Morgan Stanley uses a relative rating system using terms such as Overweight, Equal-weight, Not-Rated or Underweight (see definitions below). Morgan Stanley does not assign ratings of Buy,

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Global Stock Ratings Distribution

(as of September 30, 2026)

The Stock Ratings described below apply to Morgan Stanley's Fundamental Equity Research and do not apply to Debt Research produced by the Firm.

For disclosure purposes only (in accordance with FINRA requirements), we include the category headings of Buy, Hold, and Sell alongside our ratings of Overweight, Equal-weight, Not-Rated and Underweight. Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold, and sell but represent recommended relative weightings (see definitions below). To satisfy regulatory requirements, we correspond Overweight, our most positive stock rating, with a buy recommendation; we correspond Equal-weight and Not-Rated to hold and Underweight to sell recommendations, respectively.

	Coverage Universe		Investment Banking Clients (IBC)			Other Material Investment Services Clients (MISC)	
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1599	43%	455	48%	28%	783	44%
Equal-weight/Hold	1563	42%	394	42%	25%	763	43%
Not-Rated/Hold	2	0%	1	0%	50%	1	0%
Underweight/Sell	570	15%	96	10%	17%	227	13%
Total	3,734		946			1774	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

Analyst Stock Ratings

Overweight (O). The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Equal-weight (E). The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Not-Rated (NR). Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Underweight (U). The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

Analyst Industry Views

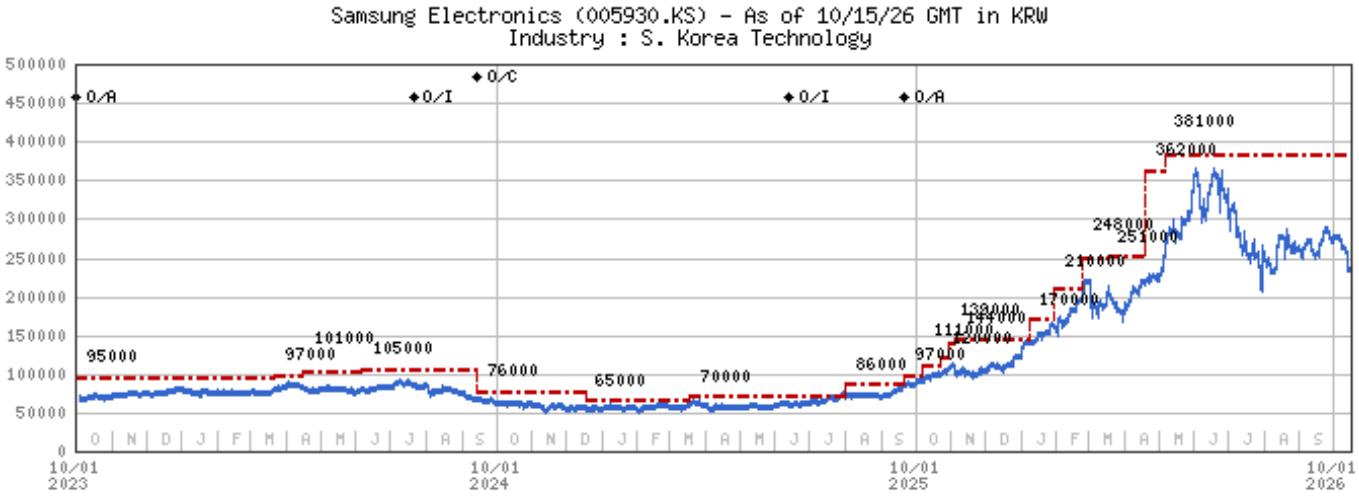
Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

In-Line (I): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

Cautious (C): The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

Stock Price, Price Target and Rating History (See Rating Definitions)



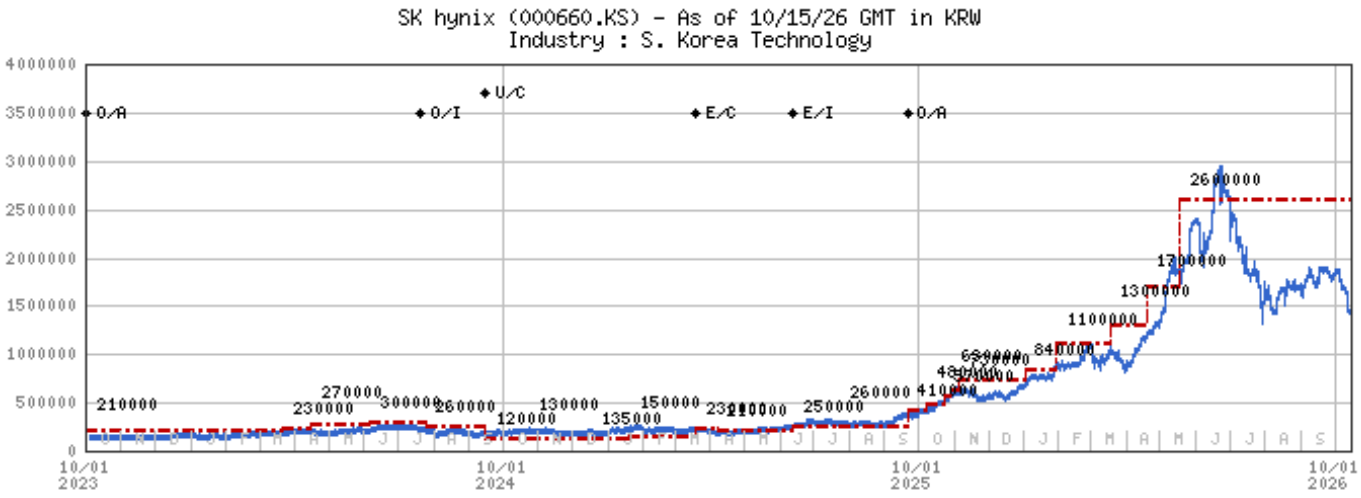
Stock Rating History: 10/1/21 : O/C; 10/4/22 : O/A; 7/21/24 : O/I; 9/15/24 : O/C; 6/13/25 : O/I; 9/21/25 : O/A

Price Target History: 9/15/21 : 95000; 12/3/21 : 97000; 3/18/22 : 95000; 4/28/22 : 85000; 6/10/22 : 80000; 7/5/22 : 75000; 7/22/22 : 70000; 9/17/22 : 68000; 3/21/23 : 70000; 5/30/23 : 90000; 7/7/23 : 95000; 3/22/24 : 97000; 4/16/24 : 101000; 6/6/24 : 105000; 9/15/24 : 76000; 12/18/24 : 65000; 3/19/25 : 70000; 8/1/25 : 86000; 9/21/25 : 97000; 10/8/25 : 111000; 10/23/25 : 120000; 10/30/25 : 139000; 11/5/25 : 144000; 1/8/26 : 170000; 1/30/26 : 210000; 2/24/26 : 248000; 3/18/26 : 251000; 4/19/26 : 362000; 5/6/26 : 381000

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target No Price Target Assigned (NA)
Stock Price (Not Covered by Current Analyst) Stock Price (Covered by Current Analyst)
Stock and Industry Ratings (abbreviations below) appear as ◆ Stock Rating/Industry View
Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)
Industry View: Attractive (A) In-line (I) Cautious (C) No Rating (NR)

Effective January 13, 2014, the stocks covered by Morgan Stanley Asia Pacific will be rated relative to the analyst's industry (or industry team's) coverage.

Effective January 13, 2014, the industry view benchmarks for Morgan Stanley Asia Pacific are as follows: relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.



Stock Rating History: 10/1/21 : U/C; 12/3/21 : E/C; 2/11/22 : O/C; 7/22/22 : E/C; 10/4/22 : O/A; 7/21/24 : O/I; 9/15/24 : U/C; 3/19/25 : E/C; 6/13/25 : E/I; 9/21/25 : O/A

Price Target History: 9/15/21 : 88000; 12/3/21 : 110000; 12/23/21 : 125000; 1/24/22 : 130000; 1/28/22 : 136000; 2/11/22 : 155000; 3/18/22 : 150000; 4/27/22 : 130000; 6/10/22 : 120000; 7/5/22 : 110000; 7/22/22 : 105000; 10/4/22 : 130000; 12/7/22 : 120000; 3/21/23 : 110000; 5/30/23 : 140000; 7/7/23 : 170000; 9/21/23 : 210000; 3/22/24 : 230000; 4/16/24 : 270000; 6/6/24 : 300000; 7/25/24 : 260000; 9/15/24 : 120000; 10/24/24 : 130000; 12/18/24 : 135000; 1/20/25 : 150000; 3/19/25 : 230000; 4/7/25 : 210000; 6/13/25 : 250000; 7/24/25 : 260000; 9/21/25 : 410000; 10/8/25 : 480000; 10/23/25 : 570000; 10/29/25 : 630000; 11/5/25 : 730000; 1/2/26 : 840000; 1/30/26 : 1100000; 3/18/26 : 1300000; 4/19/26 : 1700000; 5/18/26 : 2600000

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target No Price Target Assigned (NA)
Stock Price (Not Covered by Current Analyst) Stock Price (Covered by Current Analyst)
Stock and Industry Ratings (abbreviations below) appear as ◆ Stock Rating/Industry View
Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)
Industry View: Attractive (A) In-line (I) Cautious (C) No Rating (NR)

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INDUSTRY COVERAGE: Internet

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Brian Nowak, CFA		
Alphabet Inc. (GOOGL.O)	O (08/11/2015)	$347.64
Amazon.com Inc (AMZN.O)	O (04/24/2015)	$254.08
DoorDash Inc (DASH.O)	O (02/21/2024)	$184.01
Instacart (CART.O)	E (01/29/2024)	$49.40
Lyft Inc (LYFT.O)	E (10/24/2019)	$16.48
Meta Platforms Inc (META.O)	O (03/20/2023)	$737.54
Pinterest Inc (PINS.N)	O (07/20/2025)	$21.76
Reddit Inc (RDDT.N)	O (12/08/2024)	$148.60
Snap Inc. (SNAP.N)	E (07/22/2024)	$6.10
Uber Technologies Inc (UBER.N)	++	$69.29
Matthew Cost		
Airbnb Inc (ABNB.O)	E (09/16/2026)	$167.06

AppLovin Corp (APP.O)	O (04/10/2025)	$262.19
Booking Holdings Inc (BKNG.O)	O (02/23/2026)	$160.68
Compass, Inc. (COMP.N)	E (01/12/2026)	$8.76
Criteo SA (CRTO.O)	E (01/26/2016)	$14.89
DoubleVerify Holdings Inc (DV.N)	E (06/25/2024)	$13.50
Expedia Inc. (EXPE.O)	U (09/16/2026)	$274.69
Liftoff Mobile Inc. (LFTO.O)	E (06/29/2026)	$15.92
MNTN Inc (MNTN.N)	E (06/16/2025)	$9.40
Opendoor Technologies Inc (OPEN.O)	E (07/24/2023)	$1.99
Playtika Holding Corp (PLTK.O)	E (11/27/2022)	$2.05
Roblox Corporation (RBLX.N)	O (11/04/2024)	$47.54
Take-Two Interactive Software (TTWO.O)	O (02/01/2018)	$201.23
Trade Desk Inc (TTD.O)	E (09/10/2025)	$12.18
Unity Software Inc (U.N)	O (09/02/2024)	$41.40
Webtoon Entertainment Inc (WBTN.O)	E (07/22/2024)	$9.27
Yelp Inc (YELP.N)	U (01/10/2019)	$19.45
Zillow Group Inc (Z.O)	E (04/18/2018)	$28.33
Nathan Feather		
Bumble Inc. (BMBL.O)	++	$5.97
Chewy Inc (CHWY.N)	O (10/31/2023)	$20.83
Duolingo Inc (DUOL.O)	E (02/27/2026)	$139.73
eBay Inc (EBAY.O)	O (04/18/2024)	$116.88
Etsy Inc (ETSY.N)	E (07/20/2025)	$82.93
FIGS, Inc. (FIGS.N)	E (02/29/2024)	$18.63
Grindr Inc. (GRND.N)	O (07/01/2026)	$15.06
Match Group Inc (MTCH.O)	E (04/18/2024)	$42.40
Peloton Interactive, Inc. (PTON.O)	U (09/08/2026)	$5.06
Revolve Group Inc (RVLV.N)	E (10/20/2024)	$21.60
WW International Inc (WW.O)	E (08/01/2025)	$14.27

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Semiconductors

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Ella Tulchinsky		
Infleqtion, Inc. (INFQ.N)	E (10/15/2026)	$9.11
Xanadu Quantum Technologies Limited (XNDU.O)	E (10/15/2026)	$3.19
Joseph Moore		
Advanced Micro Devices (AMD.O)	E (06/09/2024)	$570.82
Aeva Technologies Inc (AEVA.O)	E (07/19/2021)	$10.91
Allegro Microsystems Inc (ALGM.O)	O (02/13/2026)	$32.22
Ambarella Inc (AMBA.O)	O (03/29/2016)	$61.46
Amkor Technology Inc (AMKR.O)	E (11/08/2023)	$44.82
Analog Devices Inc. (ADI.O)	O (11/16/2023)	$403.57
Astera Labs Inc (ALAB.O)	O (05/11/2025)	$300.28
Broadcom Inc. (AVGO.O)	O (06/09/2024)	$346.25
Cerebras Systems (CBRS.O)	O (06/08/2026)	
GlobalFoundries Inc (GFS.O)	E (10/28/2024)	
Intel Corporation (INTC.O)	E (02/22/2023)	
IonQ Inc (IONQ.N)	E (04/25/2023)	
Marvell Technology Group Ltd (MRVL.O)	E (09/14/2015)	
Microchip Technology Inc. (MCHP.O)	E (07/10/2024)	
Micron Technology Inc. (MU.O)	O (10/06/2025)	
Navitas Semiconductor Corp (NVTS.O)	U (04/06/2025)	



NVIDIA Corp. (NVDA.O)	O (03/16/2023)	$221.30
NXP Semiconductor NV (NXPI.O)	O (02/11/2025)	$220.83
ON Semiconductor Corp. (ON.O)	++	$73.36
Qualcomm Inc. (QCOM.O)	E (06/24/2026)	$172.62
Quantinuum (QNT.O)	O (10/15/2026)	$33.03
SanDisk Corporation. (SNDK.O)	O (03/03/2025)	$1,403.34
Semtech Corp. (SMTC.O)	E (04/06/2025)	$160.26
Silicon Laboratories Inc. (SLAB.O)	E (01/19/2021)	$221.09
SiTime Corporation (SITM.O)	O (09/16/2026)	$524.93
Skyworks Solutions Inc (SWKS.O)	E (11/28/2018)	$76.89
Texas Instruments (TXN.O)	U (04/13/2020)	$280.65
Wolfspeed, INC (WOLF.N)	NR (04/06/2025)	$24.58
Lee Simpson		
Arm Holdings plc (ARM.O)	E (04/07/2026)	$238.01
Cadence Design Systems Inc (CDNS.O)	O (02/14/2024)	$329.46
PDF Solutions Inc (PDFS.O)	O (09/08/2026)	$42.41
Synopsys Inc. (SNPS.O)	O (09/08/2026)	$479.93

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Software

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Adam Wood		
Adobe Inc. (ADBE.O)	U (07/21/2026)	$240.68
Atlassian Corporation PLC (TEAM.O)	O (01/13/2020)	$204.66
Intuit (INTU.O)	E (07/21/2026)	$310.44
Microsoft (MSFT.O)	O (07/21/2026)	$533.69
Salesforce, Inc. (CRM.N)	E (07/21/2026)	$235.95
Samsara Inc (IOT.N)	E (03/23/2023)	$40.80
ServiceNow Inc (NOW.N)	O (09/24/2025)	$139.98
Shopify Inc (SHOP.O)	O (04/19/2024)	$172.50
Workday Inc (WDAY.O)	U (07/21/2026)	$188.77
Chris Quintero		
BILL Holdings Inc (BILL.N)	E (06/10/2025)	$44.18
Blackline Inc (BL.O)	E (07/21/2026)	$29.32
Box Inc (BOX.N)	E (05/21/2024)	$38.07
CCC Intelligent Solutions Holdings Inc (CCC.O)	++	$7.64
Descartes Systems Group Inc (DSGX.O)	O (01/15/2026)	$85.34
DocuSign Inc (DOCU.O)	E (01/16/2024)	$75.23
Manhattan Associates Inc. (MANH.O)	O (10/11/2026)	$220.04
Navan Inc (NAVN.O)	O (11/24/2025)	$24.00
ServiceTitan Inc (TTAN.O)	O (01/20/2026)	$72.69
SPS Commerce Inc (SPSC.O)	U (07/21/2026)	$85.27
Vertex Inc. (VERX.O)	E (07/21/2026)	$12.74
Via Transportation Inc (VIA.N)	O (01/20/2026)	$31.35
Elizabeth Porter, CFA		
Amplitude Inc. (AMPL.O)	O (01/15/2026)	$15.29
Asana Inc (ASAN.N)	U (05/20/2025)	$9.81
Autodesk (ADSK.O)	O (08/23/2024)	$231.14
Figma Inc (FIG.N)	E (08/25/2025)	$21.48
Five9 Inc (FIVN.O)	E (10/10/2022)	$33.08
Freshworks Inc (FRSH.O)	E (10/18/2021)	$13.69
GoDaddy Inc (GDDY.N)	E (07/19/2021)	$103.36
HubSpot, Inc. (HUBS.N)	O (03/21/2023)	$226.23

Klaviyo, Inc (KVYO.N)	O (04/29/2026)	$17.01
Liveramp Holdings Inc (RAMP.N)	E (01/13/2025)	$37.61
monday.com Ltd (MNDY.O)	O (08/12/2025)	$87.47
NICE Ltd. (NICE.O)	E (07/21/2026)	$111.00
Octave Intelligence Plc (OCTV.O)	E (09/17/2026)	$19.83
RingCentral Inc (RNG.N)	E (08/08/2023)	$75.20
Sprinklr Inc (CXM.N)	E (07/19/2021)	$5.63
Sprout Social Inc (SPT.O)	E (11/17/2020)	$11.04
Toast, Inc. (TOST.N)	O (12/16/2021)	$29.85
Twilio Inc (TWLO.N)	O (02/24/2025)	$271.12
Wix.Com Ltd (WIX.O)	E (07/21/2026)	$74.31
Zeta Global Holdings Corp (ZETA.N)	E (08/01/2024)	$32.27
Zoom Communications (ZM.O)	E (10/11/2022)	$94.47
ZoomInfo Technologies Inc (GTM.O)	E (02/01/2024)	$3.91
Meryl R Thomas, CFA		
Lightspeed Commerce Inc. (LSPD.N)	E (02/18/2021)	$10.31
Meta A Marshall		
Check Point Software Technologies Ltd. (CHKP.O)	E (10/16/2023)	$134.08
CrowdStrike Holdings Inc (CRWD.O)	O (03/10/2026)	$249.29
Fortinet Inc. (FTNT.O)	E (07/21/2026)	$184.05
Gen Digital Inc. (GEN.O)	E (06/07/2024)	$23.80
Netskope, Inc. (NTSK.O)	O (10/13/2025)	$20.04
Okta, Inc. (OKTA.O)	O (12/02/2024)	$211.92
Palo Alto Networks Inc (PANW.O)	O (10/10/2017)	$375.04
Qualys Inc (QLYS.O)	U (02/09/2021)	$189.63
Rapid7 Inc (RPD.O)	U (07/21/2026)	$12.38
SailPoint Inc (SAIL.O)	O (09/02/2025)	$19.30
SentinelOne, Inc. (S.N)	E (12/02/2024)	$22.82
Tenable Holdings Inc (TENB.O)	E (12/02/2024)	$38.12
Varonis Systems, Inc. (VRNS.O)	E (01/26/2026)	$47.06
Zscaler Inc (ZS.O)	E (04/22/2026)	$220.79
Ryan Lountzis		
CoreWeave (CRWV.O)	E (04/22/2025)	$65.78
Nebius Group NV (NBIS.O)	E (01/15/2026)	$186.01
Sanjit K Singh		
Akamai Technologies, Inc. (AKAM.O)	O (01/12/2026)	$91.71
Appian Corp (APPN.O)	E (04/30/2026)	$38.45
C3.ai (AI.N)	U (01/04/2021)	$11.67
Cloudflare Inc (NET.N)	O (12/02/2024)	$324.33
Datadog, Inc. (DDOG.O)	O (01/12/2026)	$269.33
DigitalOcean Holdings Inc (DOCN.N)	O (01/16/2025)	$109.29
Dynatrace Inc (DT.N)	O (08/25/2026)	$63.58
Elastic NV (ESTC.N)	E (07/21/2026)	$92.06
GitLab Inc (GTLB.O)	E (01/12/2026)	$53.16
JFrog Ltd. (FROG.O)	E (07/21/2026)	$91.96
MongoDB Inc (MDB.O)	O (04/12/2023)	$356.29
Oracle Corporation (ORCL.N)	E (01/15/2019)	$130.55
PagerDuty, Inc. (PD.N)	U (07/21/2026)	$16.64
Palantir Technologies Inc. (PLTR.O)	E (02/04/2025)	$200.97
Snowflake Inc. (SNOW.N)	O (06/24/2025)	$335.08
UiPath Inc (PATH.N)	E (09/07/2022)	$13.06

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INDUSTRY COVERAGE: Telecom & Networking Equipment

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Meta A Marshall		
Arista Networks (ANET.N)	O (10/31/2023)	$195.42
Axon Enterprise Inc (AXON.O)	O (12/03/2024)	$408.42
Ciena Corporation (CIEN.N)	E (10/10/2025)	$359.60
Cisco Systems Inc (CSCO.O)	O (04/08/2024)	$113.64
Coherent Corp (COHR.N)	E (12/13/2023)	$263.32
Corning Inc (GLW.N)	E (06/13/2024)	$140.89
F5 Inc (FFIV.O)	E (04/12/2022)	$457.26
Keysight Technologies Inc (KEYS.N)	O (07/13/2026)	$357.62
Lumentum Holdings Inc (LITE.O)	E (05/12/2021)	$896.33
Motorola Solutions Inc (MSI.N)	O (12/17/2025)	$451.73
Zebra Technologies Corporation (ZBRA.O)	E (12/02/2024)	$376.88

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INDUSTRY COVERAGE: IT Hardware

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Erik W Woodring		
Apple, Inc. (AAPL.O)	O (05/26/2009)	$342.96
CDW Corporation (CDW.O)	O (06/23/2026)	$150.10
Cricut Inc (CRCT.O)	U (08/12/2021)	$6.49
Dell Technologies Inc. (DELL.N)	E (06/01/2026)	$507.93
Everpure, Inc. (P.N)	O (08/10/2026)	$141.49
Garmin Ltd (GRMN.N)	E (02/18/2026)	$279.72
GoPro Inc (GPRO.O)	U (12/12/2023)	$1.16
Hewlett Packard Enterprise (HPE.N)	O (08/10/2026)	$63.11
HP Inc. (HPQ.N)	U (11/16/2025)	$30.46
IBM (IBM.N)	E (01/18/2023)	$227.88
Ingram Micro (INGM.N)	E (06/11/2025)	$27.11
Kornit Digital Ltd. (KRNT.O)	E (11/06/2025)	$17.05
Logitech International SA (LOGI.O)	U (01/20/2026)	$101.16
NetApp Inc (NTAP.O)	E (08/10/2026)	$222.20
Resideo Technologies Inc (REZI.N)	O (08/11/2025)	$16.21
Seagate Technology (STX.O)	O (03/26/2024)	$713.54
SmartRent, Inc. (SMRT.N)	++	$1.16
Sonos Inc. (SONO.O)	E (11/06/2025)	$17.60
TD Synnex Corporation (SNX.N)	O (06/11/2025)	$263.76
Teradata (TDC.N)	E (08/10/2026)	$29.89
Western Digital (WDC.O)	O (04/16/2025)	$364.10
Sanjit K Singh		
Nutanix Inc (NTNX.O)	E (01/12/2026)	$69.85

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INDUSTRY COVERAGE: Multi-Industry

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Brandon Knutson		
3M Co. (MMM.N)	E (10/21/2025)	$164.46
Acuity Inc. (AYI.N)	O (01/14/2025)	$296.87
Allegion Public Limited Company (ALLE.N)	E (01/06/2025)	$152.50

Alliance Laundry Holdings Inc (ALH.N)	E (11/03/2025)	$20.71
Dover Corp (DOV.N)	E (04/14/2025)	$193.33
Fortive Corp (FTV.N)	E (09/02/2025)	$57.24
Gates Industrial Corporation PLC (GTES.N)	E (09/06/2024)	$25.85
Honeywell International Inc (HON.O)	E (09/06/2024)	$207.61
Ingersoll Rand INC (IR.N)	E (09/06/2024)	$77.94
Mirion Technologies Inc (MIR.N)	E (01/23/2026)	$15.90
Otis Worldwide Corp (OTIS.N)	E (09/06/2024)	$69.11
Ralliant Corporation (RAL.N)	O (09/02/2025)	$69.89
Stanley Black & Decker Inc (SWK.N)	E (09/06/2024)	$90.29
Christine Yao		
Ametek Inc. (AME.N)	E (04/14/2025)	$246.83
Fastenal Co. (FAST.O)	E (09/06/2024)	$52.00
Forgent Power Solutions (FPS.N)	E (03/02/2026)	$32.70
Parker-Hannifin Corp (PH.N)	E (06/05/2025)	$956.32
QXO Inc (QXO.N)	O (08/04/2026)	$10.33
Teledyne Technologies Inc. (TDY.N)	E (12/12/2022)	$608.90
W.W. Grainger Inc. (GWW.N)	E (09/06/2024)	$1,330.62
Watsco Inc (WSO.N)	E (04/14/2025)	$295.09
Toby Okwara		
Carrier Global Corp. (CARR.N)	E (09/06/2024)	$54.24
Eaton Corporation PLC (ETN.N)	++	$408.85
Emerson Electric Co (EMR.N)	U (09/06/2024)	$161.08
Hubbell Inc. (HUBB.N)	E (09/06/2024)	$473.37
Johnson Controls International Plc (JCI.N)	O (09/06/2024)	$152.44
Lennox International Inc (LII.N)	U (01/06/2025)	$348.84
Rockwell Automation (ROK.N)	O (09/06/2024)	$423.42
Trane Technologies PLC (TT.N)	O (09/06/2024)	$471.29
Vertiv Holdings Co. (VRT.N)	O (01/06/2025)	$222.83

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INDUSTRY COVERAGE: Machinery, Engineering, & Construction

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
Angel Castillo		
AGCO Corp (AGCO.N)	U (04/16/2025)	$106.78
Allison Transmission Holdings Inc (ALSN.N)	E (01/08/2024)	$110.70
Caterpillar Inc (CAT.N)	E (05/01/2026)	$748.98
CNH Industrial NV (CNH.N)	O (12/17/2024)	$11.98
CRH (CRH.N)	O (09/11/2026)	$79.20
Cummins Inc (CMI.N)	O (01/08/2024)	$525.96
Deere & Co. (DE.N)	O (01/08/2024)	$650.38
Donaldson Company Inc. (DCI.N)	E (11/24/2025)	$87.21
ERock Inc (EROC.N)	O (07/06/2026)	$9.93
ITG Inc (ITG.O)	O (07/27/2026)	$5.98
Kennametal Inc. (KMT.N)	U (08/10/2026)	$30.90
Lincoln Electric Holdings Inc (LECO.O)	E (08/10/2026)	$257.81
Martin Marietta Materials Inc (MLM.N)	O (01/08/2024)	$471.10
Oshkosh Corp (OSK.N)	E (01/08/2024)	$127.57
PACCAR Inc (PCAR.O)	E (04/16/2025)	$108.56
Target Hospitality Corp. (TH.O)	O (08/17/2026)	$17.26
Terex Corp. (TEX.N)	O (12/10/2025)	$52.21
Timken Co (TKR.N)	O (12/17/2024)	$112.32
United Rentals Inc. (URI.N)	O (04/16/2025)	$1,034.81

Vulcan Materials Company (VMC.N)	E (01/08/2024)	$241.77
Westinghouse Air Brake Technologies Corp (WAB.N)	O (01/08/2024)	$286.49
WillScot Holdings Corporation (WSC.O)	E (11/12/2025)	$16.19

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INDUSTRY COVERAGE: Clean Tech

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
David Arcaro, CFA		
Array Technologies Inc (ARRY.O)	E (10/17/2023)	$3.38
Bloom Energy Corp. (BE.N)	O (01/09/2023)	$239.34
Enphase Energy Inc (ENPH.O)	U (04/23/2025)	$29.35
EVgo Inc (EVGO.O)	E (06/02/2025)	$1.09
First Solar Inc (FSLR.O)	O (12/08/2023)	$179.08
Fluence Energy Inc (FLNC.O)	E (11/22/2021)	$6.21
GE Vernova (GEV.N)	O (08/01/2024)	$941.78
Innio N.V. (INIO.O)	O (06/29/2026)	$16.50
Plug Power Inc. (PLUG.O)	U (12/06/2023)	$1.45
Shoals Technologies Group (SHLS.O)	E (12/16/2025)	$7.84
Solaredge Technologies Inc (SEDG.O)	E (12/16/2025)	$30.52
Sunrun Inc (RUN.O)	E (04/23/2025)	$7.30
X-Energy Inc. (XE.O)	O (05/19/2026)	$11.64

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INDUSTRY COVERAGE: Diversified Utilities / IPPs

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
David Arcaro, CFA		
AES Corp. (AES.N)	E (03/06/2026)	$14.96
American Electric Power Co (AEP.O)	O (03/10/2020)	$126.13
Constellation Energy Corporation (CEG.O)	O (03/25/2026)	$279.54
MGE Energy, Inc. (MGEE.O)	U (11/17/2021)	$71.32
NextEra Energy Inc (NEE.N)	O (09/06/2022)	$78.37
NRG Energy Inc (NRG.N)	E (12/09/2022)	$100.85
Public Service Enterprise Group Inc (PEG.N)	O (07/02/2020)	$70.56
Solaris Energy Infrastructure (SEI.N)	O (12/02/2025)	$69.37
Talen Energy Corp (TLN.O)	O (03/12/2025)	$358.42
Vistra Corp (VST.N)	O (03/25/2019)	$151.79

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INDUSTRY COVERAGE: Regulated Utilities

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/14/2026)
David Arcaro, CFA		
Algonquin Power & Utilities Corp (AQN.N)		$5.15
Ameren Corp (AEE.N)	E (04/14/2020)	$104.58
Atmos Energy Corp. (ATO.N)	E (12/16/2025)	$163.94
CenterPoint Energy Inc (CNP.N)	E (07/17/2024)	$39.68
CMS Energy Corp (CMS.N)	E (07/31/2017)	$66.82
Consolidated Edison Inc (ED.N)	U (07/02/2020)	$109.60
Dominion Energy Inc (D.N)	E (12/02/2024)	$62.80
DTE Energy Co. (DTE.N)	O (01/06/2022)	$128.31

Duke Energy Corp (DUK.N)	E (08/25/2014)	$119.64
Edison International (EIX.N)	U (09/06/2022)	$55.44
Entergy Corp (ETR.N)	E (11/04/2024)	$104.50
Eversource Energy (ES.N)		$66.67
Exelon Corp (EXC.O)	E (12/18/2023)	$42.60
FirstEnergy Corp (FE.N)	O (03/23/2020)	$45.41
IDACORP Inc (IDA.N)	O (12/16/2025)	$136.94
OGE Energy Corp (OGE.N)	E (06/24/2026)	$47.51
ONE Gas Inc (OGS.N)	E (01/06/2022)	$74.05
PG&E Corp (PCG.N)	E (09/18/2025)	$13.15
Pinnacle West Capital Corp (PNW.N)	E (03/23/2020)	$102.04
PPL Corp (PPL.N)	O (12/15/2022)	$34.75
Sempra (SRE.N)	O (12/13/2024)	$81.99
Southern Company (SO.N)	U (12/16/2025)	$89.38
Spire Inc (SR.N)	O (12/16/2025)	$79.80
Xcel Energy Inc (XEL.O)	E (10/19/2021)	$75.36

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INDUSTRY COVERAGE: Greater China Technology Hardware

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/15/2026)
Andy Meng, CFA		
AAC Technologies Holdings (2018.HK)	O (01/29/2024)	HK$35.48
Accelink Technologies Co. Ltd. (002281.SZ)	U (05/12/2022)	Rmb132.96
BYD Electronics (0285.HK)	O (04/28/2023)	HK$22.38
China TransInfo Technology Co Ltd (002373.SZ)	E (07/18/2023)	Rmb7.17
Dahua Technology Co. Ltd. (002236.SZ)	E (12/12/2024)	Rmb14.83
Eoptolink Technology Inc Ltd (300502.SZ)	O (02/27/2026)	Rmb306.01
Genius Electronic Optical Co. Ltd. (3406.TW)	E (10/13/2026)	NT$1,115.00
GoerTek Inc (002241.SZ)	E (08/14/2026)	Rmb20.23
Gosuncn Technology Group Co Ltd (300098.SZ)	U (11/07/2022)	Rmb3.96
HIKVision Digital Technology (002415.SZ)	E (12/12/2024)	Rmb33.86
Largan Precision (3008.TW)	O (10/13/2026)	NT$6,605.00
LianChuang Electronic Technology Co Ltd (002036.SZ)	U (06/12/2024)	Rmb5.40
Lingyi Itech Guangdong Co (002600.SZ)	U (04/23/2025)	Rmb9.86
Lingyi Itech Guangdong Co (1688.HK)	O (08/14/2026)	HK$4.65
Luxshare Precision Industry Co., Ltd. (2475.HK)	O (08/14/2026)	HK$45.28
Luxshare Precision Industry Co., Ltd. (002475.SZ)	O (10/24/2016)	Rmb44.65
OFILM Group Co Ltd (002456.SZ)	U (06/12/2024)	Rmb6.07
Q Technology (Group) Company Ltd (1478.HK)	U (03/23/2026)	HK$4.70
Quectel Wireless Solutions Co Ltd (603236.SS)	E (10/09/2024)	Rmb67.88
Shanghai Conant Optical Co Ltd (2276.HK)	O (04/10/2026)	HK$34.08
Shenzhen Transsion Holdings Co Ltd (688036.SS)	E (03/23/2026)	Rmb48.20
Sunny Optical (2382.HK)	E (03/23/2026)	HK$57.15
Suzhou TFC Optical Communication Co Ltd. (300394.SZ)	E (11/06/2025)	Rmb223.33
Wingtech Technology Co Ltd (600745.SS)	U (05/18/2026)	Rmb13.89
Xiaomi Corp (1810.HK)	O (04/14/2021)	HK$27.08
Yangtze Optical Fibre and Cable JSC Ltd (601869.SS)	U (10/13/2021)	Rmb333.10
Yangtze Optical Fibre and Cable JSC Ltd (6869.HK)	O (07/15/2026)	HK$122.60
Yongxin Optics Co Ltd (603297.SS)	E (11/15/2022)	Rmb93.92
Zhejiang Crystal-Optech Co Ltd (002273.SZ)	O (11/15/2022)	Rmb19.52
Zhongji Innolight Co Ltd (300308.SZ)	O (09/07/2026)	Rmb656.94
Zhongji Innolight Co Ltd (3308.HK)	O (09/07/2026)	HK$784.00
ZTE Corporation (0763.HK)	O (06/04/2026)	HK$19.29

ZTE Corporation (000063.SZ)	E (06/04/2026)	Rmb26.81
Derrick Yang		
Accton Technology Corporation (2345.TW)	O (06/06/2024)	NT$1,950.00
Advantech (2395.TW)	O (01/20/2021)	NT$698.00
AirTAC International (1590.TW)	O (04/16/2025)	NT$1,155.00
Asia Vital Components Co. Ltd. (3017.TW)	O (07/30/2024)	NT$3,085.00
AU Optronics (2409.TW)	E (02/10/2026)	NT$34.90
Auras Technology Co Ltd (3324.TWO)	E (05/04/2023)	NT$1,410.00
Bizlink (3665.TW)	O (03/10/2025)	NT$2,015.00
BOE Technology (000725.SZ)	O (09/06/2019)	Rmb5.05
Chenbro (8210.TW)	O (07/23/2025)	NT$833.00
Chroma Ate Inc. (2360.TW)	O (10/05/2021)	NT$2,025.00
Delta Electronics Inc. (2308.TW)	O (07/13/2017)	NT$1,630.00
E Ink Holdings Inc. (8069.TWO)	E (08/10/2026)	NT$146.50
Ennostar Inc (3714.TW)	U (09/23/2022)	NT$61.50
Fositek Corp (6805.TW)	O (06/25/2025)	NT$2,115.00
Hiwin Technologies Corp. (2049.TW)	O (03/30/2026)	NT$311.00
Innolux (3481.TW)	E (04/07/2025)	NT$48.30
King Slide Works Co. Ltd. (2059.TW)	O (11/08/2023)	NT$9,720.00
Lens Technology (300433.SZ)	E (07/22/2020)	Rmb25.65
Lite-On Technology (2301.TW)	E (01/15/2025)	NT$268.00
TCL Corp. (000100.SZ)	E (04/07/2025)	Rmb4.45
Tianma Microelectronics (000050.SZ)	U (01/24/2018)	Rmb5.81
Howard Kao		
Acer Inc. (2353.TW)	U (04/23/2025)	NT$31.70
Asustek Computer Inc. (2357.TW)	U (11/16/2025)	NT$975.00
Catcher Technology (2474.TW)	U (11/17/2025)	NT$195.00
Compal Electronics (2324.TW)	U (04/23/2025)	NT$36.00
Elite Material Co. (2383.TW)	O (09/14/2026)	NT$5,120.00
FIT Hon Teng Ltd (6088.HK)	O (11/03/2025)	HK$3.95
Foxconn Industrial Internet Co. Ltd. (601138.SS)	O (07/10/2019)	Rmb46.90
Giga-Byte Technology Co. Ltd. (2376.TW)	E (11/16/2025)	NT$347.00
Gold Circuit Electronics Ltd. (2368.TW)	O (10/06/2022)	NT$1,190.00
Hon Hai Precision (2317.TW)	O (03/15/2024)	NT$239.50
Inspur Electronic Information (000977.SZ)	E (08/28/2023)	Rmb57.06
Kingboard Laminates Holdings Ltd. (1888.HK)	O (09/14/2026)	HK$38.28
LandMark Optoelectronics Corporation (3081.TWO)	E (03/26/2026)	NT$2,640.00
Lenovo (0992.HK)	O (07/10/2026)	HK$25.98
Lotes Co. Ltd. (3533.TW)	E (05/12/2025)	NT$1,815.00
Nan Ya PCB (8046.TW)	O (02/23/2026)	NT$1,345.00
Pegatron Corporation (4938.TW)	E (03/25/2026)	NT$98.10
Quanta Computer Inc. (2382.TW)	O (05/01/2023)	NT$316.50
Shengyi Technology Co Ltd. (600183.SS)	E (05/26/2022)	Rmb114.61
Shennan Circuits Co Ltd (002916.SZ)	E (08/24/2023)	Rmb318.80
Unimicron (3037.TW)	O (02/23/2026)	NT$1,075.00
Visual Photonics Epitaxy Co Ltd (2455.TW)	E (09/11/2023)	NT$483.50
Wistron Corporation (3231.TW)	O (07/12/2023)	NT$176.00
Wiwynn Corp (6669.TW)	O (11/10/2025)	NT$1,905.00
Yageo Corp. (2327.TW)	O (10/28/2025)	NT$573.00
Zhen Ding (4958.TW)	++	NT$519.00
Irene Yen		
Co-Tech Development Corp. (8358.TWO)	O (09/14/2026)	NT$461.50
Taiwan Union Technology Corporation (6274.TWO)	O (09/14/2026)	NT$1,625.00

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INDUSTRY COVERAGE: S. Korea Technology

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/15/2026)
Ryan Kim		
Fadu Inc (440110.KQ)	O (09/21/2025)	W57,100
Hanmi Semiconductor Co. Ltd. (042700.KS)	U (10/12/2026)	W192,200
HD Hyundai Electric Co Ltd (267260.KS)	O (03/25/2025)	W487,000
Isu Petasys Co. Ltd. (007660.KS)	O (02/03/2025)	W96,300
Leeno Industrial Inc. (058470.KQ)	O (04/03/2025)	W67,200
LG Display (034220.KS)	E (06/11/2025)	W7,320
LG Electronics (066570.KS)	O (08/11/2026)	W168,600
LG Innotek (011070.KS)	O (08/11/2026)	W401,000
Lotte Energy Materials Corp (020150.KS)	U (04/03/2025)	W52,100
LS Electric (010120.KS)	O (01/22/2026)	W155,700
SK Square Co Ltd. (402340.KS)	O (05/06/2026)	W765,000
Wonik IPS Co Ltd (240810.KQ)	O (08/08/2025)	W102,700
Shawn Kim		
Samsung Electro-Mechanics (009150.KS)	O (07/31/2025)	W1,163,000
Samsung Electronics (005935.KS)	O (11/18/2019)	W159,100
Samsung Electronics (005930.KS)	O (11/18/2019)	W210,000
SK hynix (000660.KS)	O (09/21/2025)	W1,262,000

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INDUSTRY COVERAGE: Technology - European Semiconductors

COMPANY (TICKER)	RATING (AS OF)	PRICE* (10/15/2026)
Lee Simpson		
Aixtron SE (AIXGn.DE)	E (05/25/2023)	€30.98
ASM International NV (ASMI.AS)	O (06/19/2024)	€765.60
ASML Holding NV (ASML.AS)	O (09/22/2025)	€1,464.20
BE Semiconductor Industries NV (BESI.AS)	O (11/07/2022)	€163.40
Infineon Technologies AG (IFXGn.DE)	E (09/08/2026)	€52.47
Melexis N.V. (MLXS.BR)	E (02/05/2026)	€56.75
Nordic Semiconductor ASA (NOD.OL)	E (02/10/2025)	NKr 167.40
Soitec SA (SOIT.PA)	O (03/26/2026)	€129.85
STMicroelectronics NV (STMPA.PA)	O (03/26/2026)	€41.41
VAT Group AG (VACN.S)	E (03/21/2025)	SFr 623.60

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