

AI, Datacenters & Power

Impacts on utilities

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Presenter



Stefanie Williams is a Senior Research Analyst on the 451 Research Datacenter Services & Infrastructure team within S&P Global Market Intelligence. Stefanie's research includes analysis of datacenter providers, market size and supply/demand in key and emerging markets in North America and Australia-New Zealand. Additional areas of focus include US state-level legislated incentives, datacenter compliance, and datacenter management and optimization software.

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Agenda

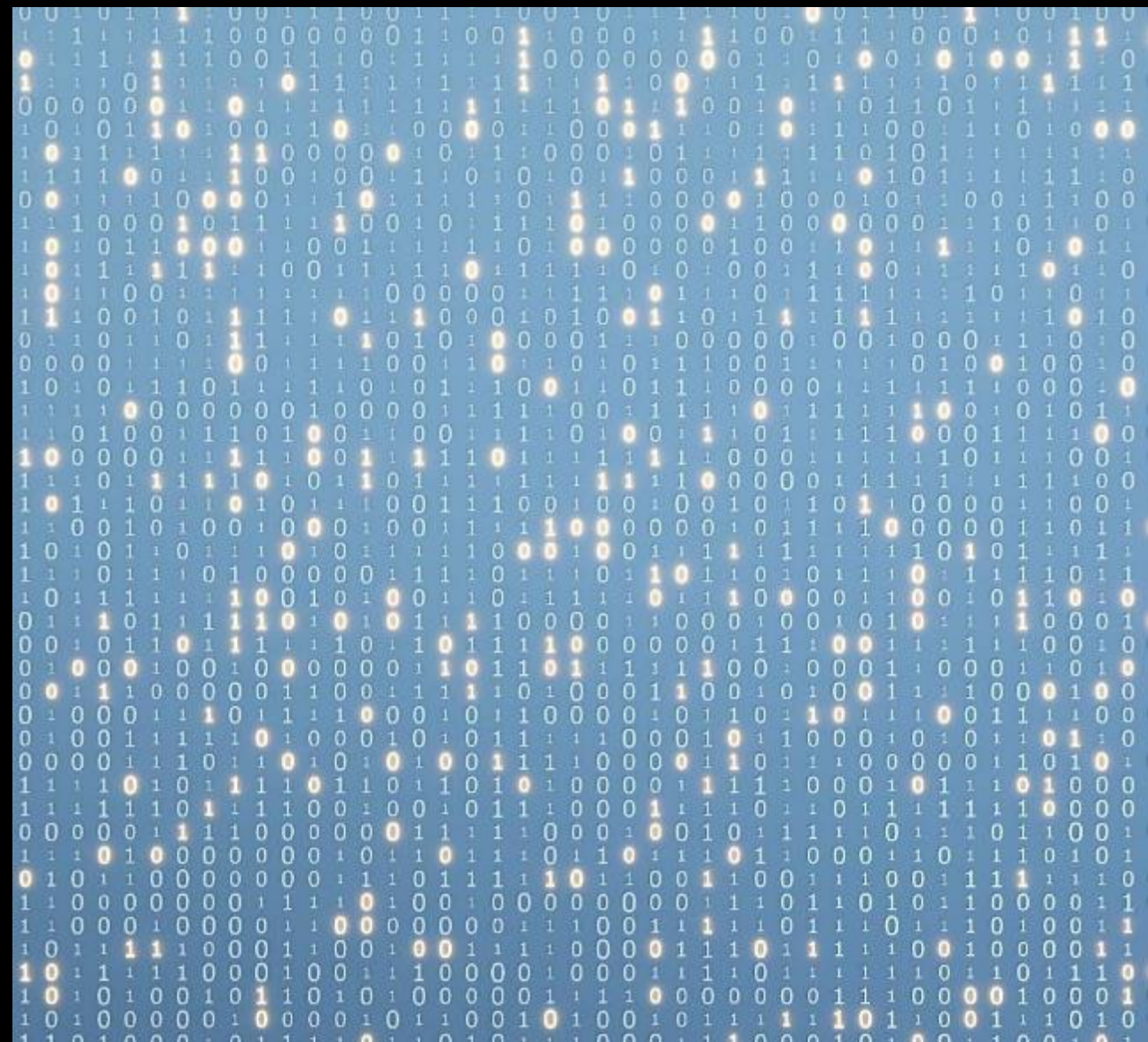
AI/Cloud Supercycle

Datacenter implications

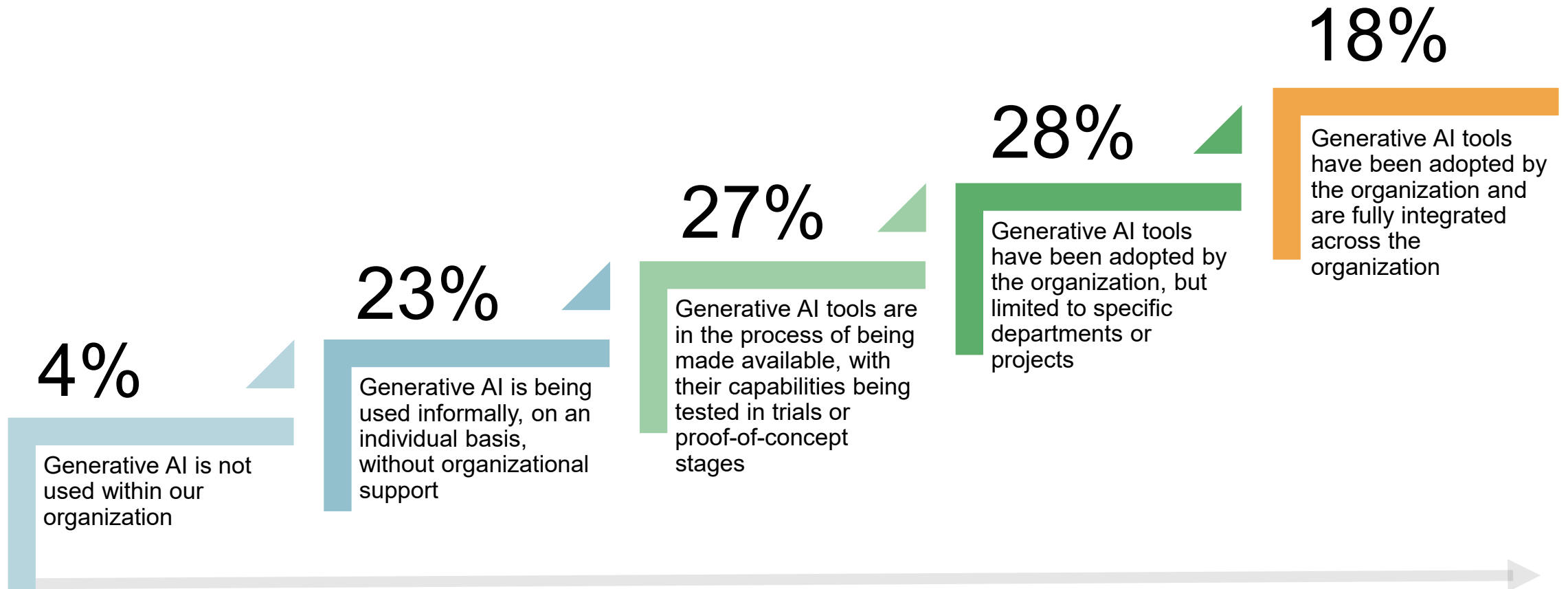
Discussion/Q&A



AI Supercycle fueling disruption



Organizations are aggressively integrating generative AI

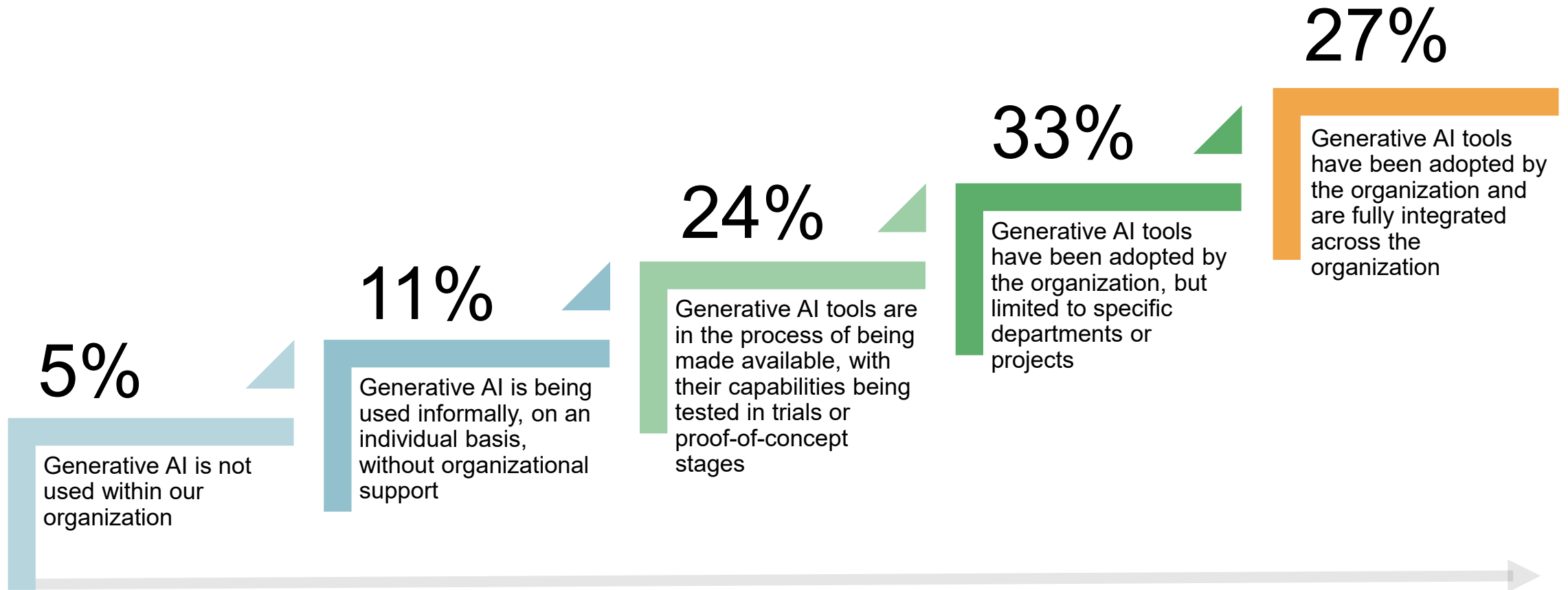


Q. Which of these statements most accurately reflects the use of generative AI at your organization?

Base: All respondents (n=712).

Source: 451 Research's Voice of the Enterprise: AI & Machine Learning, Infrastructure 2024.

Organizations are aggressively integrating generative AI

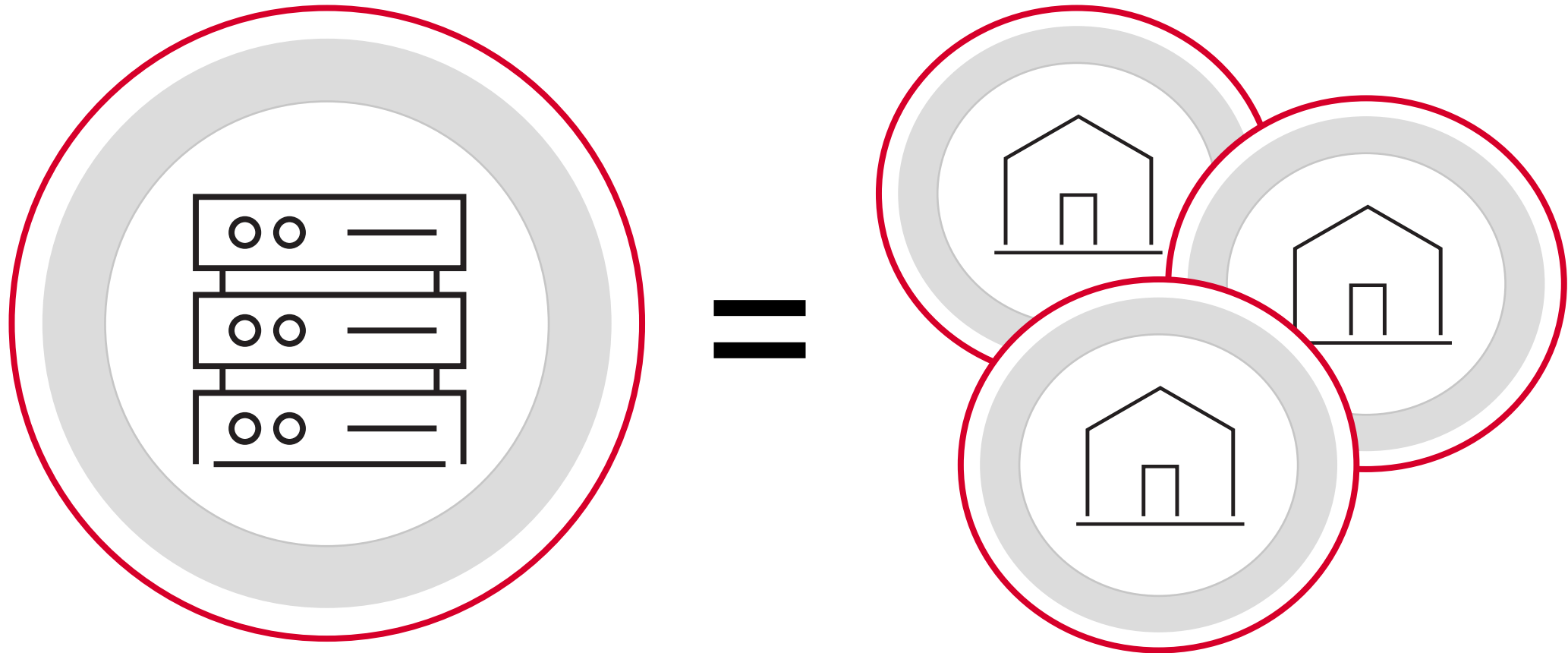


Q. Which of these statements most accurately reflects the use of generative AI at your organization?

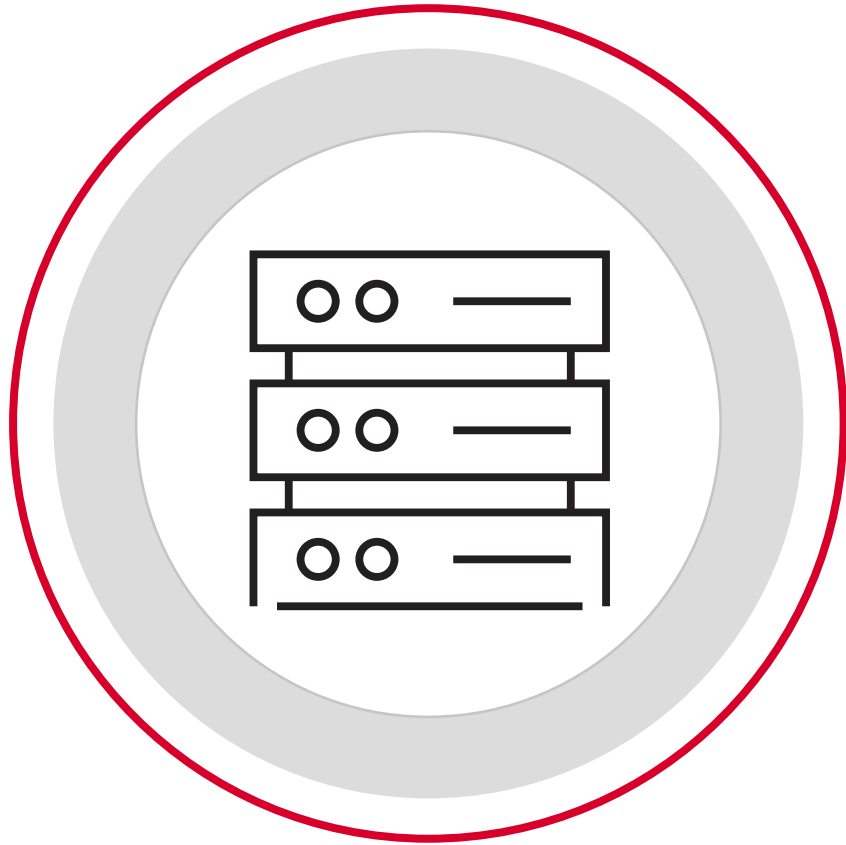
Base: All respondents (n=1006).

Source: 451 Research's Voice of the Enterprise: AI & Machine Learning, Use Cases 2025

Traditional rack = 3 homes



High-density rack = 80-100 homes

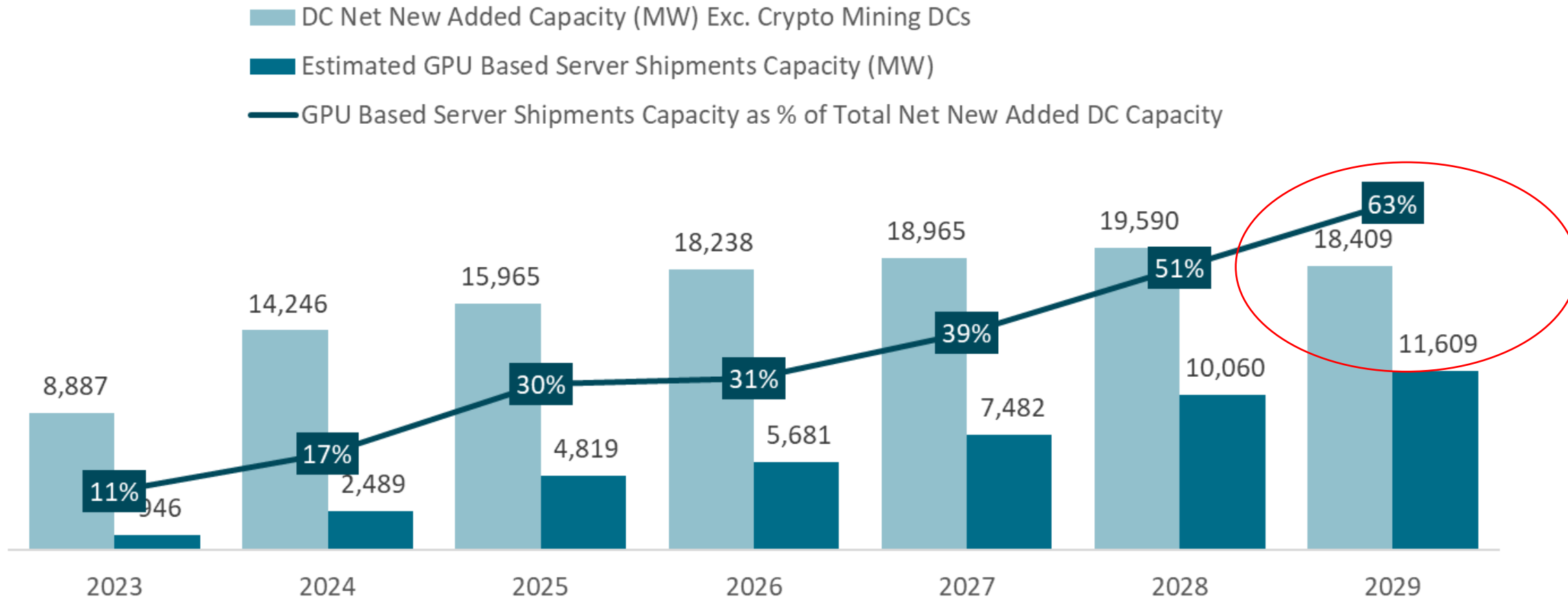


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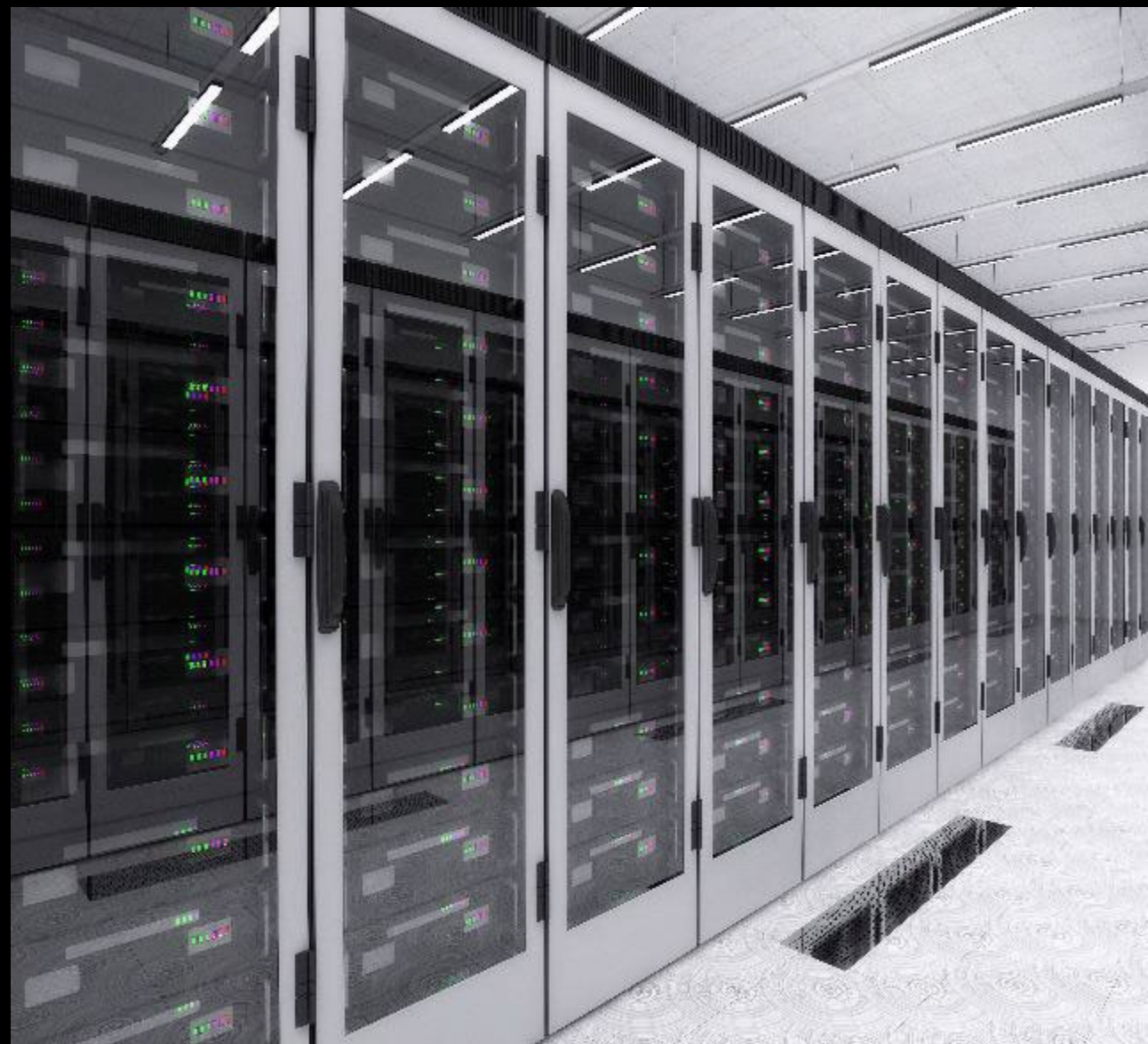
11+ GW per year could be required by 2029 just for GPUs

Global GPU Impact on Datacenters



Source: GPU Impact on Datacenters – Market Monitor, March 2025

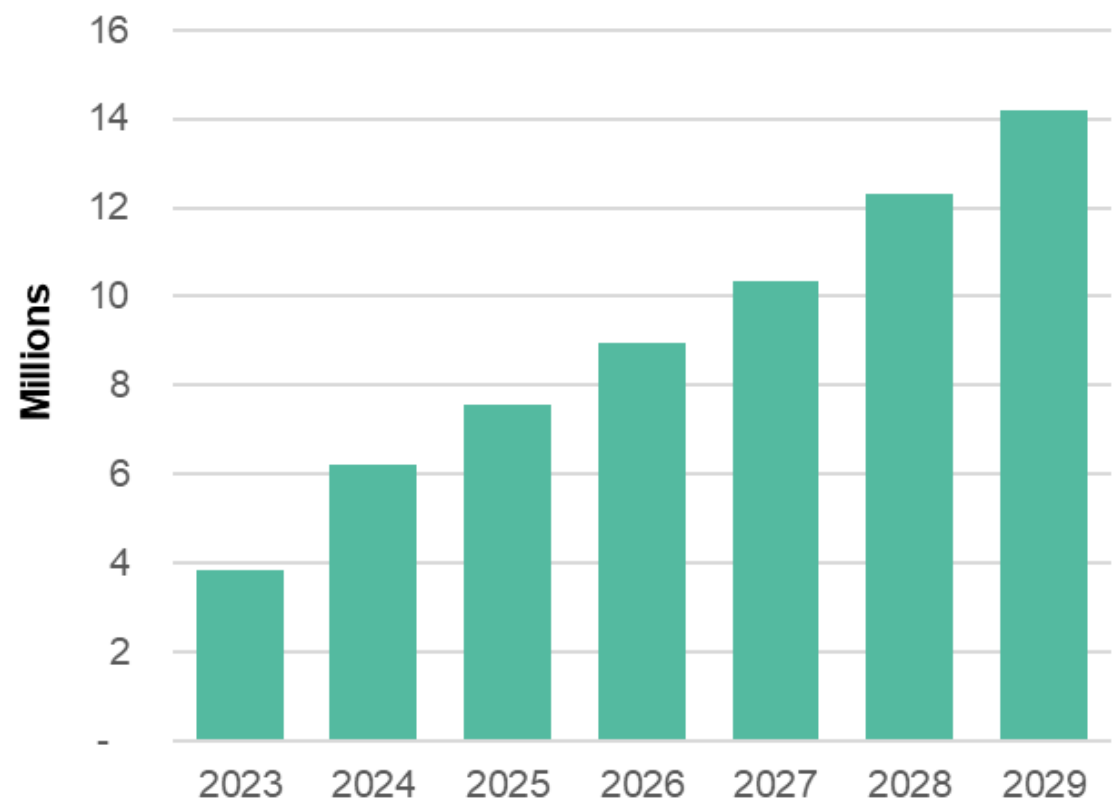
Datacenter implications



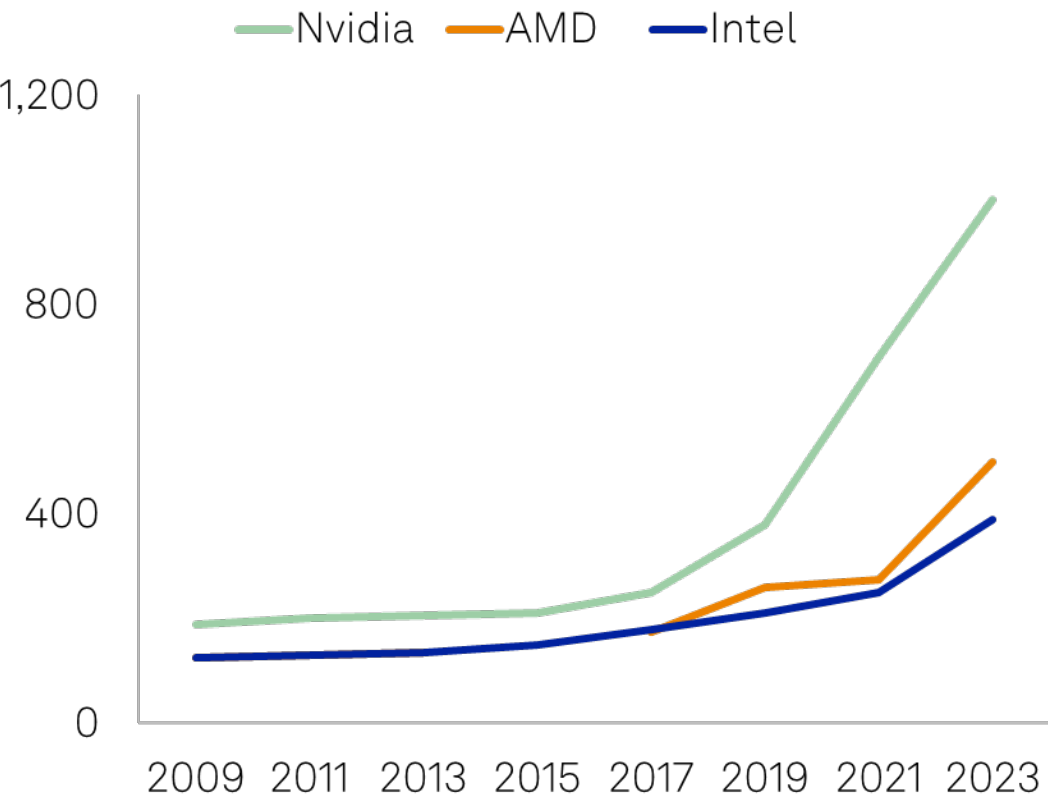
Modeling typically requires GPU chips (energy-intensive)

Inferencing requirements still developing

GPU chip shipments per year

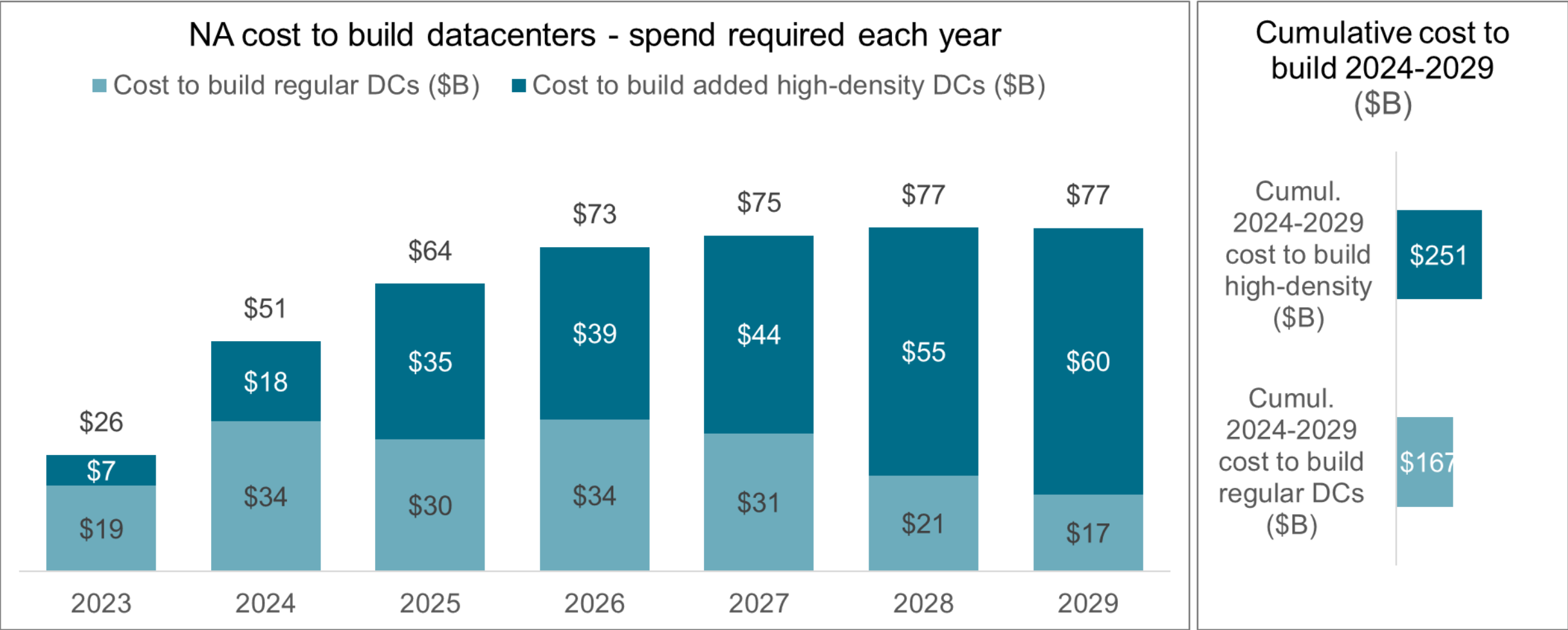


Watts per chip



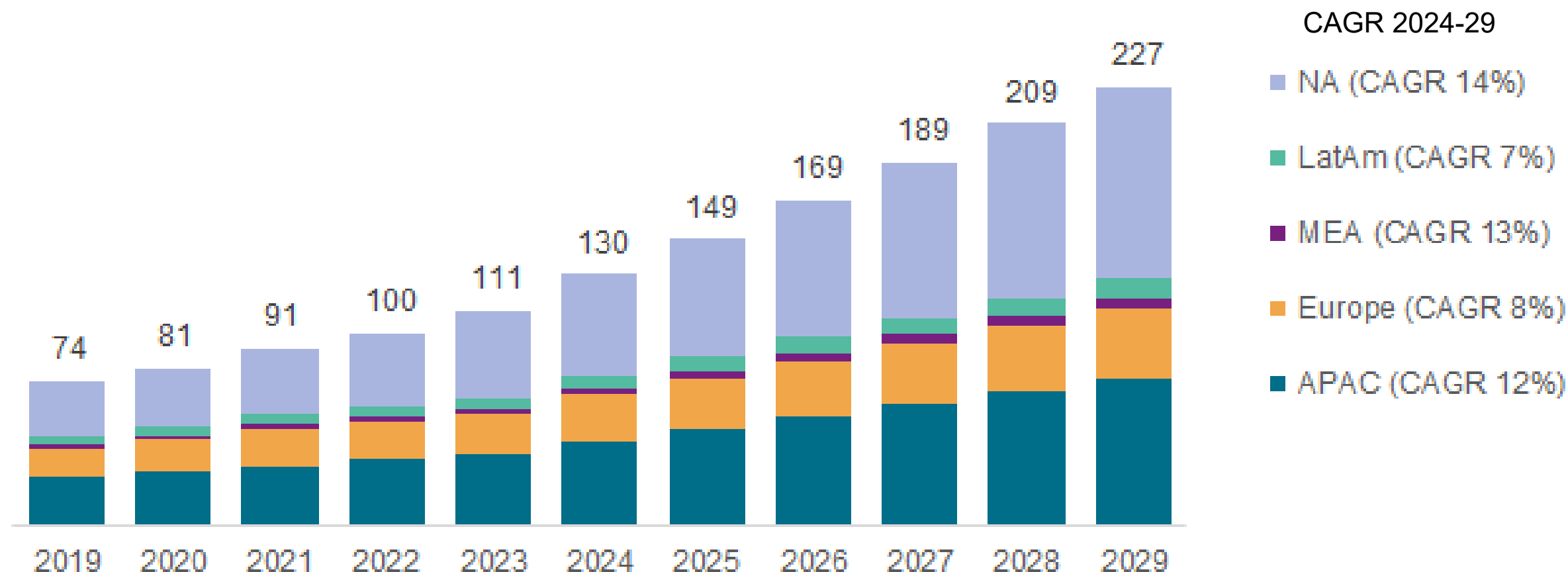
Note: Watts per chip are industry estimates.
Source: 451 Research's Tech Trend in Focus: AI Infrastructure and the GPU Explosion 2025.

To be built at considerable cost



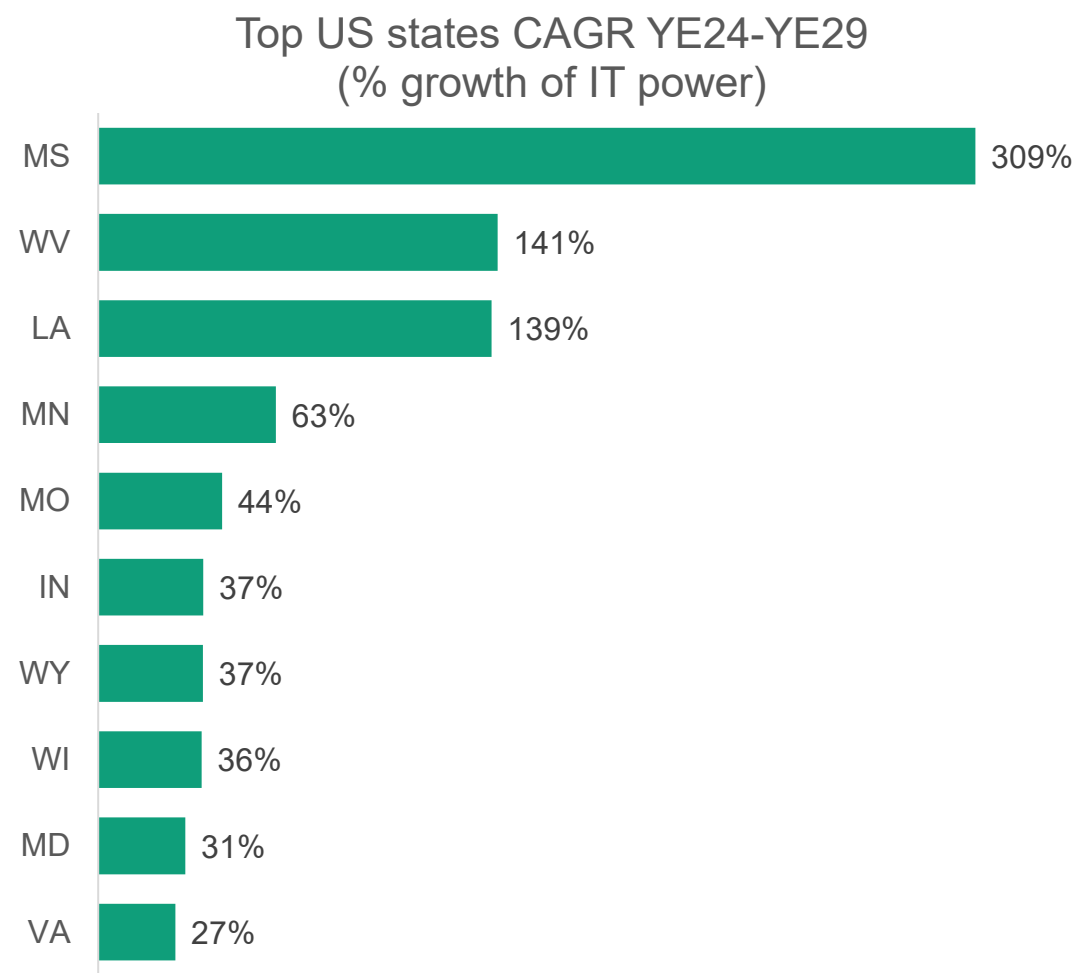
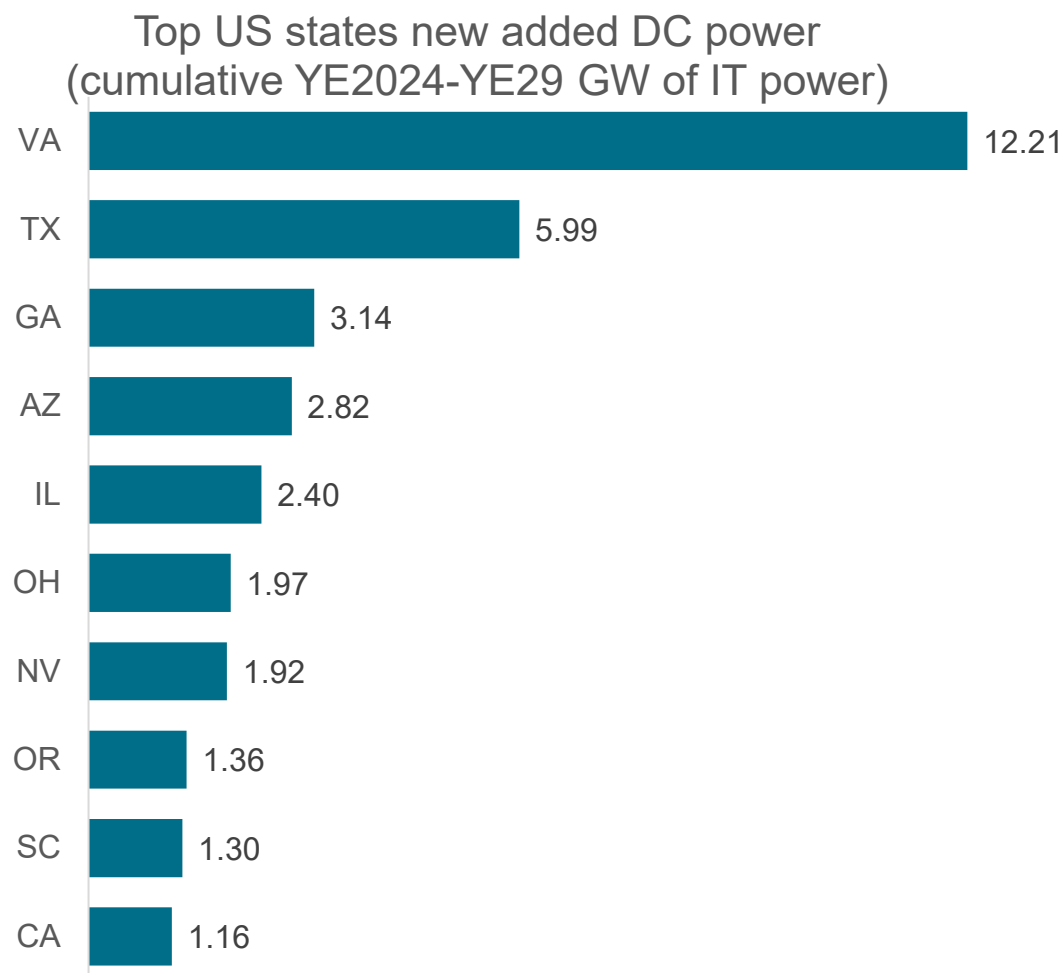
Source: : GPU Impact on Datacenters – Market Monitor, March 2025; 451Research estimates

Most new demand is expected in the US (to start)



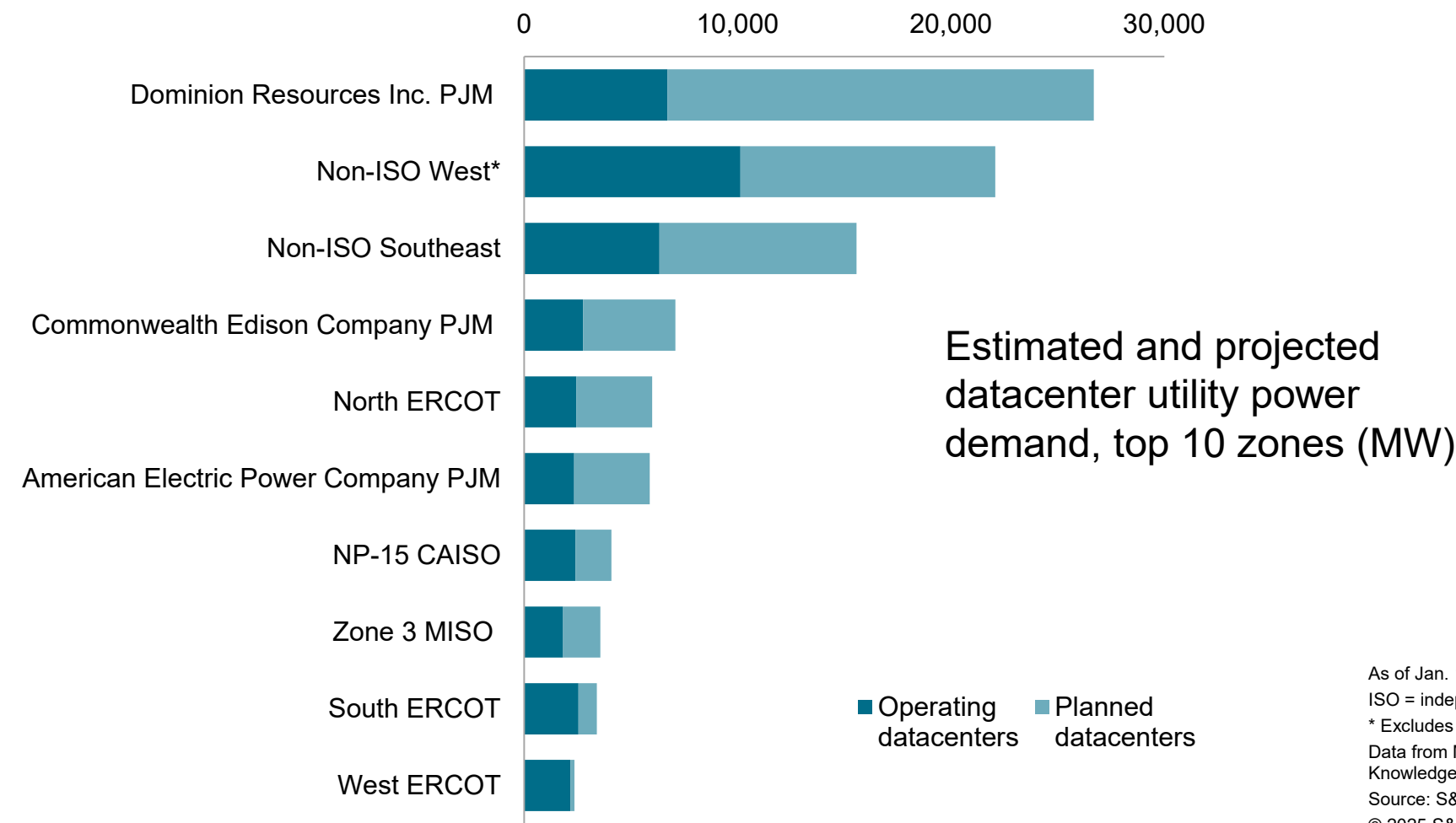
Source: 451 Research Datacenter Market Monitor, March 2025

VA, TX, GA to grow most in MW – MS, WV, LA may grow most in %



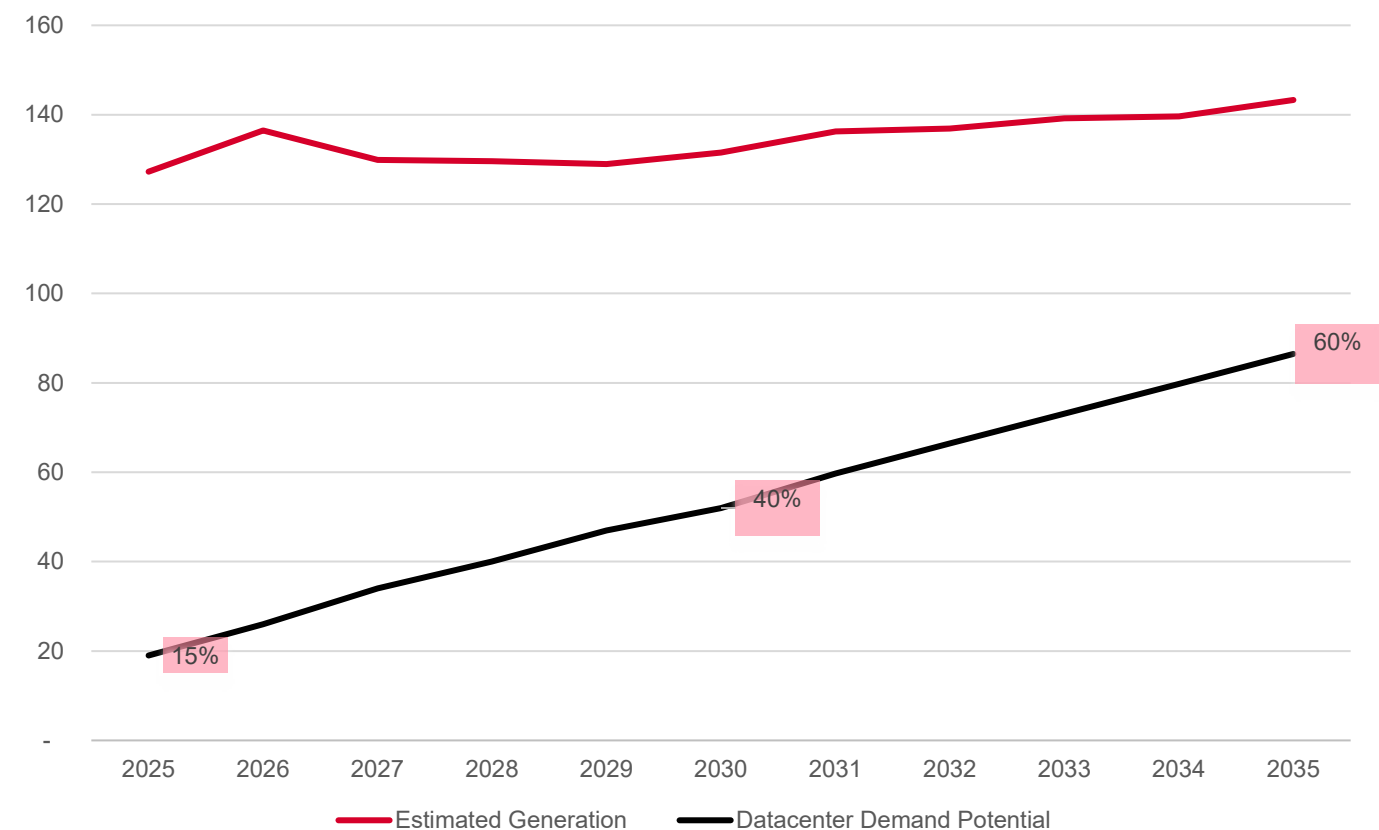
Source: 451 Research Datacenter Market Monitor, March 2025

Putting pressure on utilities



As of Jan. 10, 2025.
ISO = independent system operator.
* Excludes Non-CAISO Areas California.
Data from Market Intelligence 451 Research's Q3 2024 Datacenter KnowledgeBase.
Source: S&P Global Market Intelligence.
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Georgia datacenter demand and statewide generation



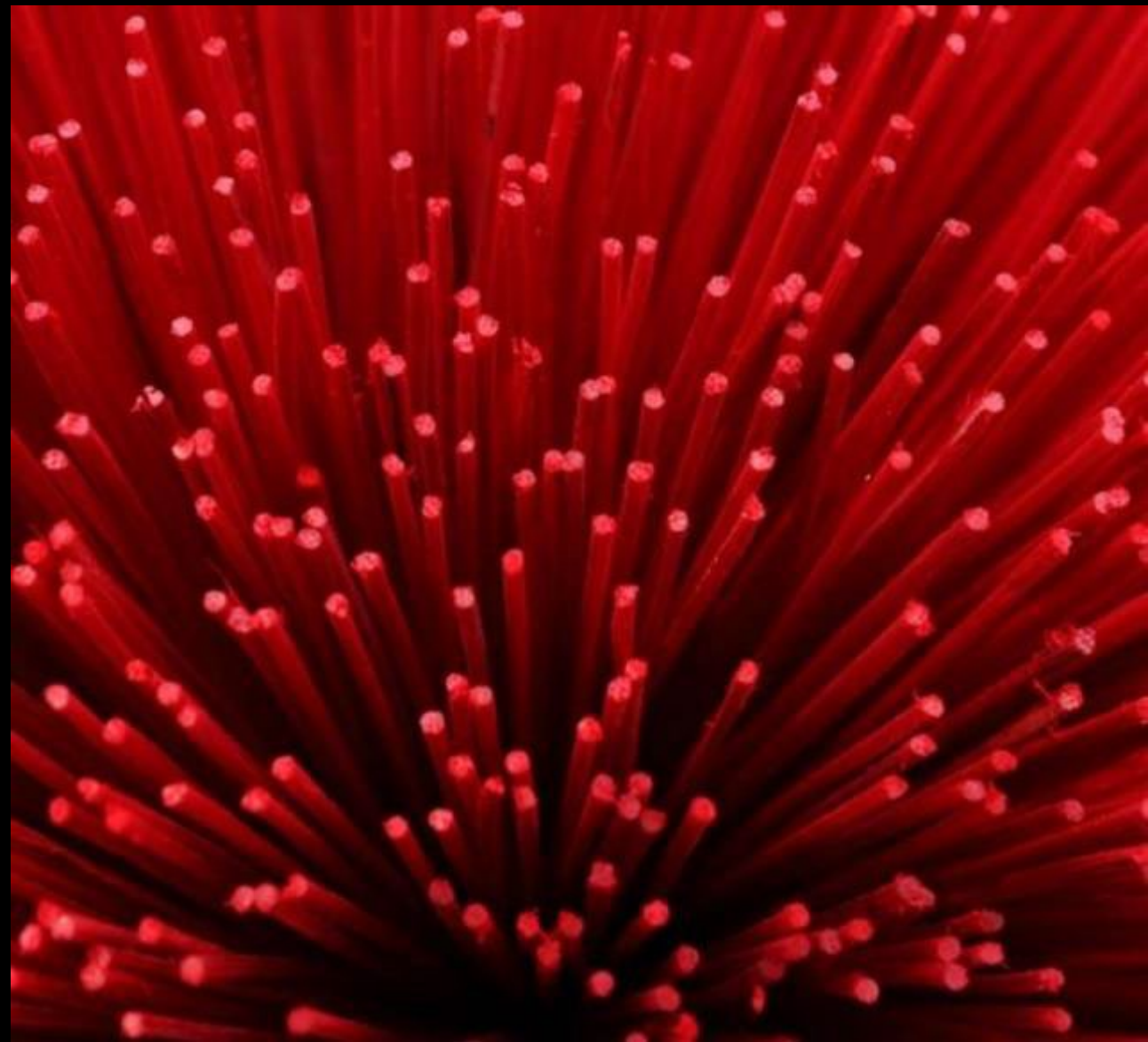
As of Jul. 1, 2025.
Data from Commodity Insights Market Indicative Power Forecast, Q1 2025, Market Intelligence 451 Research's Q1 2025 Datacenter KnowledgeBase 2025 – 2030,
Source: S&P Global Market Intelligence, S&P Global Commodity Insights
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Biggest datacenter supply challenges

- Wait for transmission lines, substations
- Power allocated from utility
- Supply chain for datacenter equipment
- Adapting designs for higher density/AI workloads
- Sustainability – PPAs, sources of “green” power
- Staffing in remote locations
- Costs – tax incentives, build vs lease, retrofit for AI
- Intermittent power, redundancy challenges



Conclusions/ What to watch



Key takeaways

- Datacenter growth needed for “regular” workloads
- More capacity needed for GPU chips (for AI/ML)
- US is seeing first wave of AI growth – will move to other countries in 2-4 years
- Impacting an already stressed US electricity grid
- Supply chain issues exacerbate challenges building power/transmission/DC infrastructure for AI
- Sustainability/renewable energy still important
- Edge is growing now and AI inferencing will impact this longer term (5+ years) but anyone’s guess how much (depends on use cases for AI)



What to watch

- AI adoption among enterprises
- Who is “winning” re cloud modeling
 - OpenAI
 - Google
 - xAI
 - Anthropic
- Shifting needs of hyperscalers (cancelling contracts)
- Utility infrastructure builds/gas turbine availability
- Behind-the-meter options for AI datacenters
- Continued interest in PPAs/green power options
- Nuclear progress – tests/builds by 2030



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