

From Compute Demand to Capacity Delivered

Unlocking the Data Center Value Chain Through OCP-Aligned Design and Supply Chain Innovation

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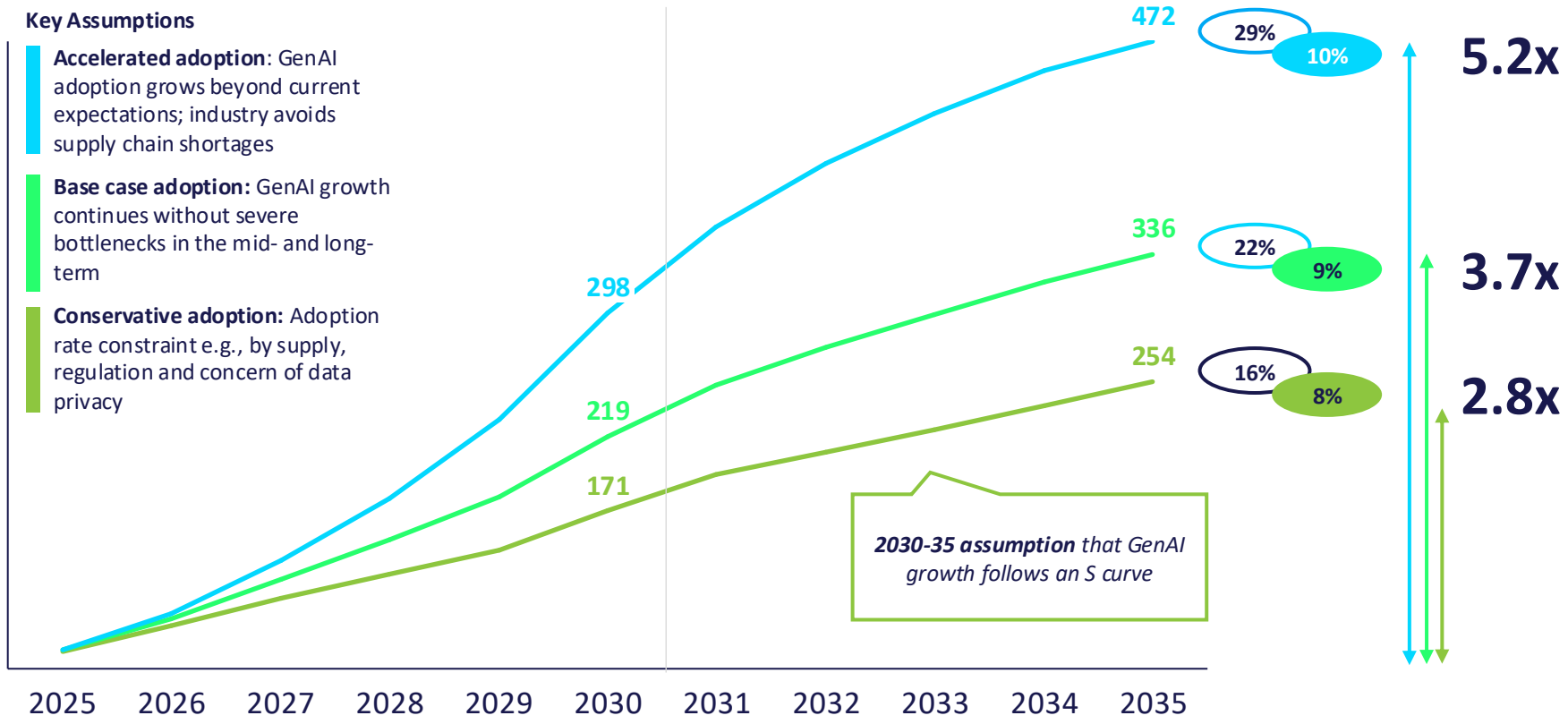
Global DC demand is projected to reach ~336GW by 2035 with an inflection in growth rate in ~2030



Estimated Global Data Center Demand, in GW IT compute, 2025 - 2035

Key Assumptions

- **Accelerated adoption**: GenAI adoption grows beyond current expectations; industry avoids supply chain shortages
- **Base case adoption:** GenAI growth continues without severe bottlenecks in the mid- and long-term
- **Conservative adoption:** Adoption rate constraint e.g., by supply, regulation and concern of data privacy



Takeaways

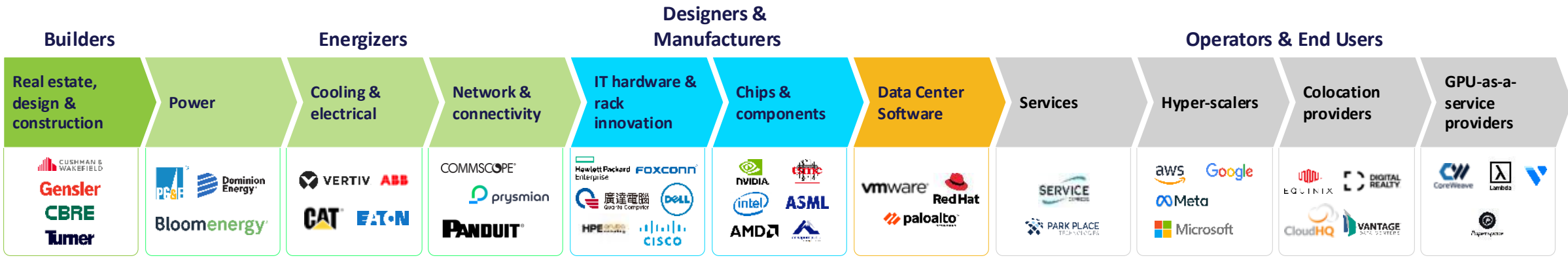
- **~3-5x demand is forecast to 2035** due to increase in compute requirements driven partly by generative AI and machine learning
- **~15-30% CAGR 2025-2035** can be largely attributed to major cloud providers (e.g., AWS, Google, Meta) expanding their data centre footprints to support cloud computing and streaming
- **65-114GW of capacity will be in the US** alone with 75% of the share of total capacity driven by AI workloads in 2030 in the U.S.

Source: McKinsey Proprietary datacentre demand model

Still in early innings – we anticipate $7.3 T to be cumulatively deployed through 2030

2025-2030 capital investments across data center value chain segments ($, T)

ALL FIGURES ARE GLOBAL



~$1.0 T
Builders: Cumulative CAPEX 2025-2030

~$1.3 T
Energizers: Cumulative CAPEX 2025- 2030

~$4.4 T
Designers & manufacturers: Cumulative CAPEX 2025-2030

~$0.6 T
Software: Cumulative CAPEX 2025-2030

= **~$7.3 T**
(~1% of global GDP/year[1])

- ~$0.6 T Labor
- ~$0.3 T Shell & Site[2]
- ~$0.1 T Land Acquisition
- ~$0.8 T Electrical & Mechanical Equipment
- ~$0.4 T Power Generation
- ~$0.1 T Network Infra
- ~$3.5 T Servers (incl. GPUs & CPUs)
- ~$0.8 T Storage
- ~$0.4 T Stacking layers
- ~$0.2 T Overarching layers

1. Global GDP: $106T (2023) | 2. Includes MEP
Note: Capital investments by Operators & End users were not included in this analysis
Source: McKinsey Data Center CAPEX TAM & Demand Model, Expert interviews, Expert interviews, CapIQ, Goldman Sachs, Analyst reports

Power | Power is the single biggest barrier to data center growth, and the industry is responding with onsite generation at scale

The problem

~100 GW by 2030

Industry experts project U.S. data center demand will reach ~100 GW by 2030, but only 65% of announced capacity is expected to come online

Grid access is the bottleneck

Interconnection timelines, transmission constraints, and equipment lead times are the top three barriers, with energization taking up to 4-5 years

65% deploying onsite power

Most Data Center players are turning to onsite generation, with ~60% of that capacity expected to be permanent, not temporary bridge

What it means

Reliability and speed over cost

Power reliability and time to power come top of the list in siting, onsite power selection and utility selection, and both command the highest willingness to pay premiums (~15%)

Natural gas is the near- term preferred solution

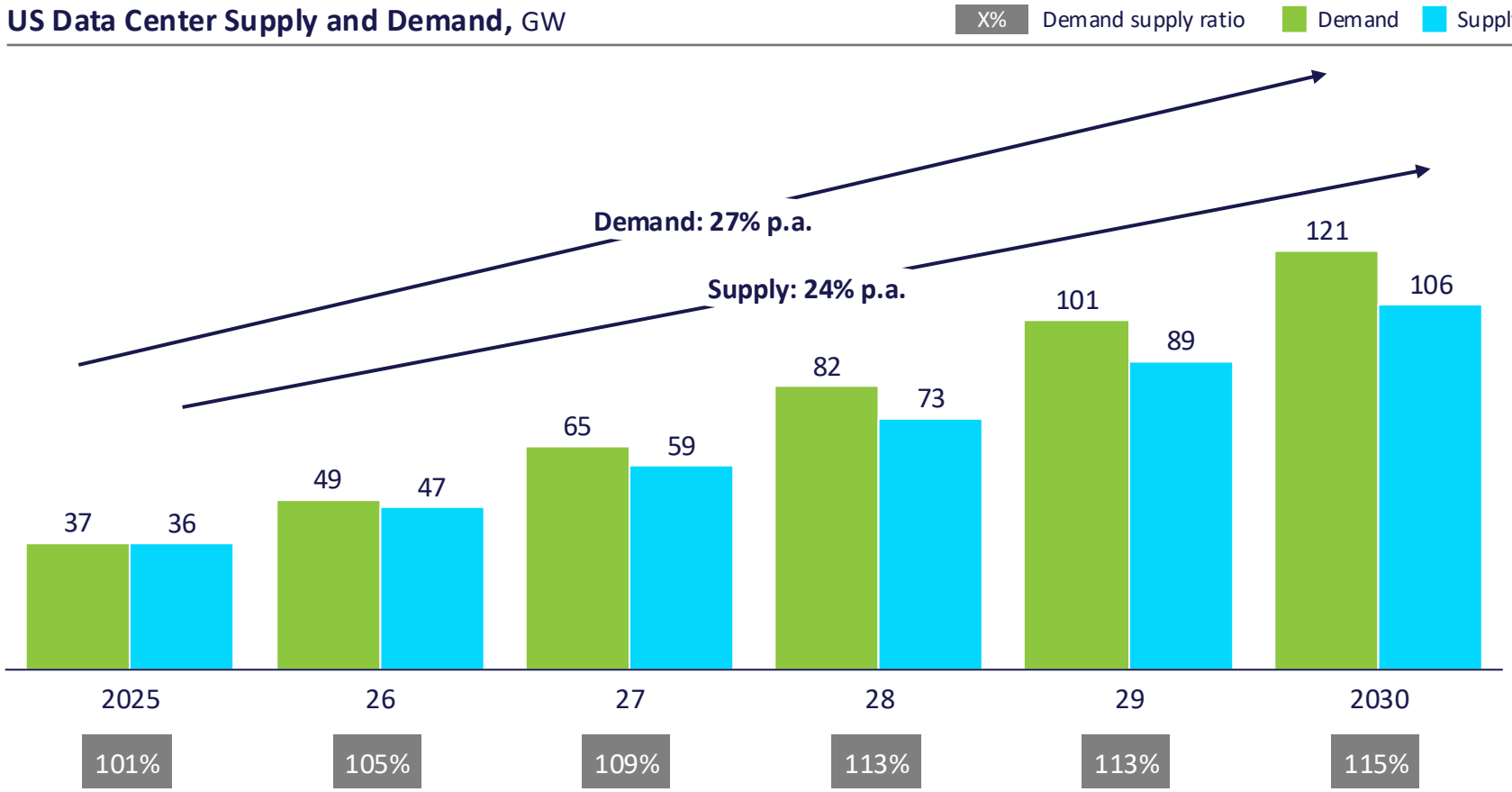
Natural gas and renewables are the most preferred onsite generation technologies today, with gas technologies (turbines, engines, fuel cells) expected to hold ~52% of 2030 onsite share

Clean energy ambition outpaces execution

Most players target ~50% clean energy by 2030, but only 27% are confident they'll hit it, and willingness to pay for clean attributes is the lowest of any power attribute at 9.3% premium

US supply gap| Expected to widen to ~15GW in 2030 driven by time-to-power constraints

US Data Center Supply and Demand, GW



Key Insights

US demand is expected to outpace supply by 3 p.p. from 2025 to 2030, resulting in a **15GW supply shortfall by 2030**

Price premiums are expected to persist, driven by this sustained structural imbalance

Demand gap widens to 113% in 2028 when demand spikes (i.e., server shipments forecasted to peak as technology cycles mature) and **gap expected to persist to 2030**

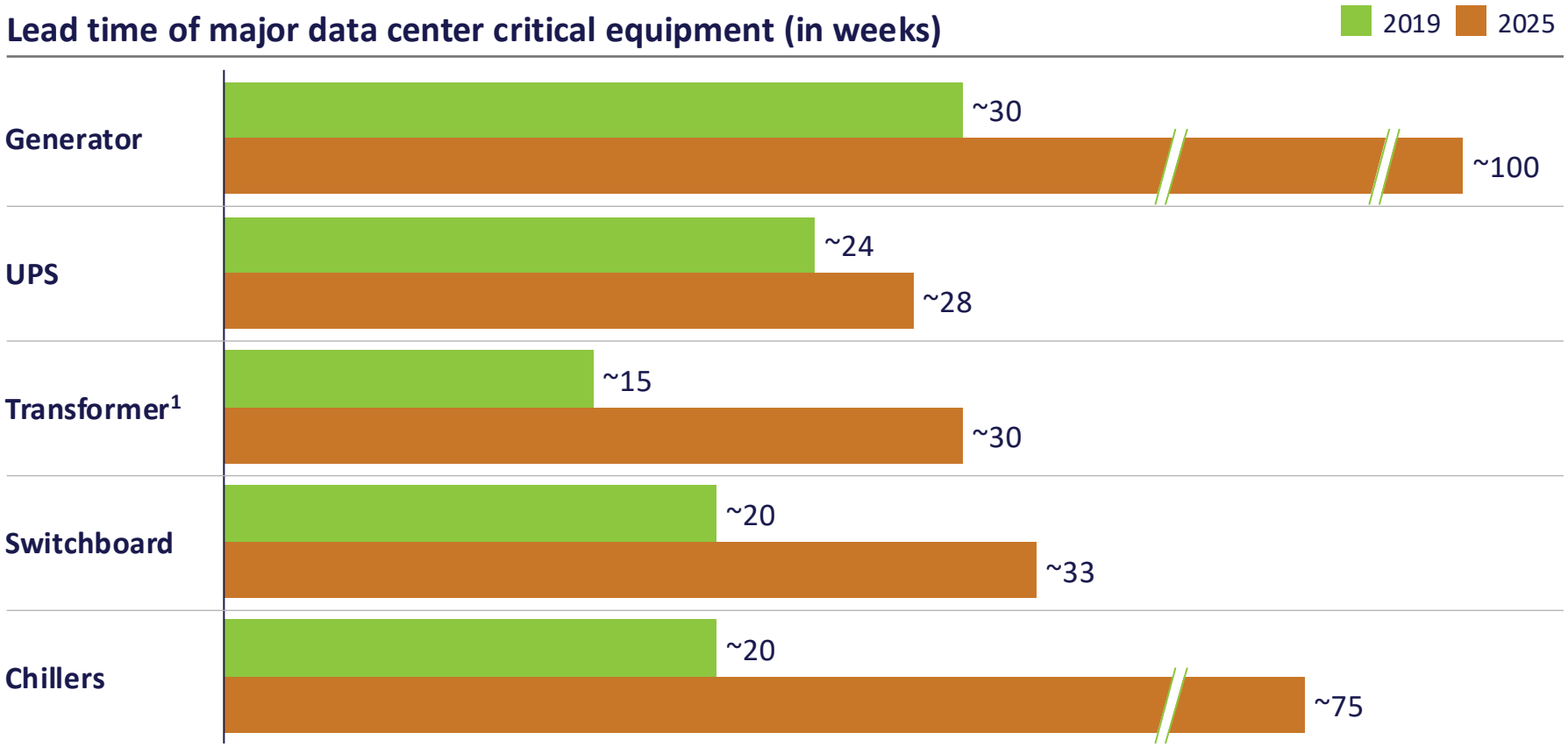
Capacity unable to meet demand due to construction-related challenges (e.g., **time to power**, **community pushback,** delays in securing MEP equipment, labor shortages)

Source: McKinsey Proprietary Data Center demand and supply model

Equipment lead times | Lead times have increased by 2-3x for critical equipment (e.g., generators, chillers, etc.)

NOT EXHAUSTIVE

Lead time of major data center critical equipment (in weeks)



Generators and chillers have more than tripled their lead times vs. 2019 (~100 and ~75 weeks, respectively)

Lead times are longest for colocation and enterprise data centers that:

- Do not use standardized equipment
- Have no strategic supplier base
- Utilize project-based procurement as opposed to centralized/portfolio procurement process

1. Medium Voltage

Source: Press search, Expert Interviews, McKinsey analysis

The current approaches make an impact but are not enough to resolve the supply chain constraints



Should-cost modeling

Building bottom-up cost baselines for various types of greyspace and whitespace equipment to quantify impact of standardization



New supplier market entry

Identifying and qualifying credible new entrants against open specs, broadening a supply base too concentrated to meet projected 2030 demand



Supplier capacity ramp-up

Working on helping with manufacturing throughput and debottlenecking to compress lead times and enable delivery



End-to-end supply chain optimization

Rethinking each step involved throughout the integration, logistics and assembly points

Bespoke specifications amplify every bottleneck; OCP standardization breaks the cycle

From…

- **Each operator qualifies independently**, creating months of redundant testing
- **Power and cooling require custom rack designs,** reducing repeatability and extending lead times
- **Equipment is procured project by project,** limiting purchasing scale
- **IT and facility require unique interfaces,** slowing reuse and commissioning

The result: Fragmented, bespoke deployments extend lead times by 6-12 months

To…

- **Open specifications enable shared validation,** eliminating redundant testing
- **Standardized power and cooling designs** improve repeatability and shorten lead times
- **Standardized components enable purchasing scale** and stronger supplier economics
- **Standardized interfaces between IT and facility** enable reuse and faster commissioning

The result: OCP-validated, standardized deployment can potentially shorten lead times by 3-6[1] months and enable faster scale

1. Lead time reduction via standardization will vary by component type (e.g., power gen vs. chillers)

How can you be involved?



Focus community effort on the interfaces that limit deployment speed

Domain	OCP Initiative	Expected outcome
Power	Power Distribution	Faster rack deployment
Cooling	Cooling Environments	Liquid cooling interoperability
Rack	Rack and Power	Fungible AI racks
Network	Open Cluster Designs for AI	Portable AI clusters
Grid	Open Data Centers for AI	Standardized power integration


Thank
You!
OCP
GLOBAL
SUMMIT
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