



Financing the AI Buildout

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The AI Revolution Is Also a Physical Capital Boom

- AI is usually described as an **intangible** revolution in models, software, and data.
- But frontier AI requires enormous amounts of:
 - specialized chips,
 - electricity and transmission,
 - cooling and networking,
 - purpose-built data centers.
- The result is a **large-scale infrastructure investment cycle**.

Two questions

- ① How large is the buildout?
- ② Who supplies the capital, owns the assets, and **bears the risk**? How have the financial structures changed?

The Scale of the Buildout

- Current U.S. capacity: **~57 GW** operating.
- Project pipeline: **~509 GW** planned across 2,933 projects.
- Source: Cleanview project-level records, accessed July 23, 2026.
- Our central realization scenario:
 - **182.7 GW operational by 2032,**
 - 117.2 GW built after 2032,
 - 226.9 GW never completed.

Astronomical cost

Building 182.7 GW in compute capacity in form of modern AI campuses would cost **\$10.3 trillion** over 2025-2032. Equivalent to **3.63% of GDP per year**.

What Does a 200 MW AI Campus Actually Cost?

Component	\$bn	Share
Data center facility	2.20	26.8%
Power infrastructure	0.40	4.9%
IT equipment	5.62	68.4%
Total: 200 MW campus	8.22	100%

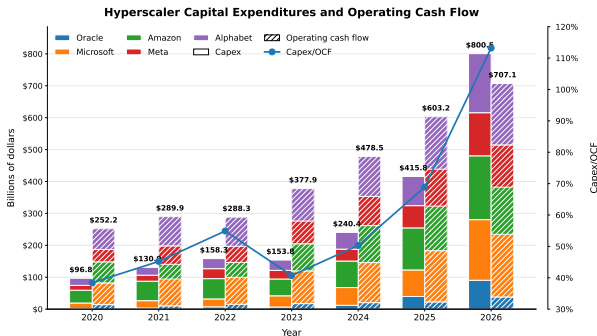
- Breakdown: **32% real estate and energy infrastructure; 68% compute hardware.**

Historical Perspective: Major U.S. Capex Booms

Episode	Period	Size (% of GDP)
Canals	1836–1841	0.66
Railroads	1870–1890	2.24
Electrification	1905–1925	0.50
Highways	1956–1973	1.13
Telecom and fiber	1996–2003	1.10
AI buildout	2025–2032	3.63

- The boom is already visible in macro aggregates: AI infrastructure investment contributed meaningfully to U.S. GDP growth in 2025 and 2026:Q1 (Soto et al., 2026).
- Shared structure: **general-purpose technology** induces complementary investment in large physical network, returns depend on uncertain future demand.
- Prior capex booms associated with severe downturns and financial crises.
- Unlike canals or highways, however, much of the AI IT capital has a **short economic life**.

Hyperscaler Capex Is Outgrowing Internal Cash Flow



- Hyperscaler capex: \$97bn (2020) → \$416bn (2025) → **\$800bn (2026E)**;
Operating cash flow: \$252bn → \$603bn → \$707bn.
- **Capex/OCF crosses 100% in 2026 for the first time.**
- Enormous OCFs, yet not enough to finance the full investment cycle internally.

The Great Risk Shift

Historically

- Hyperscalers funded and owned facilities directly using retained earnings and corporate debt.
- They therefore bore construction, utilization, and residual-value risk.

More recently and increasingly

- Specialized developers, infrastructure funds, REITs, and private equity build or acquire data centers.
- Project debt, private credit, leases, JVs, and structured finance provide debt capital.
- GPUs themselves are increasingly financed through asset-backed securitizations.

The new AI compute eco-system

Users of compute $\neq$ owners of assets $\neq$ investors bearing the risk

Hyperion: A New Financing Template

- Meta's Hyperion campus currently **2 GW / \$30bn**, with road map to expand to 5 GW, \$50bn+.
- A joint venture, Beignet, was created with Blue Owl-managed funds.
- Blue Owl contributed **\$2.45bn for an 80% equity interest**; Meta retained 20%.
- The SPV raised approximately **\$27.3bn of external debt**.
- The debt was rated **A+ by S&P**, only one notch below Meta's AA- corporate rating.
- Largest single IG corporate bond issuance in U.S. history

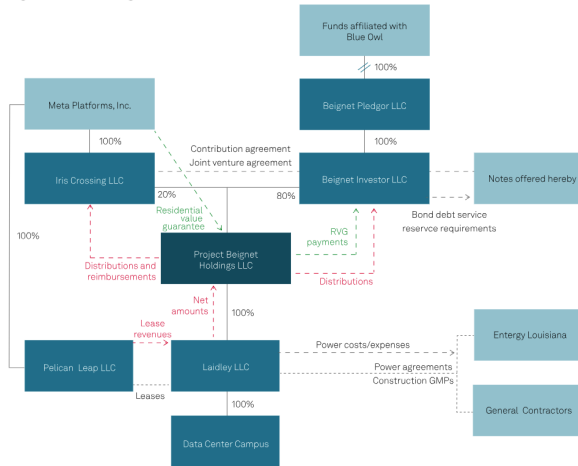
The striking feature: high leverage

Structuring results in **90% debt-to-assets**, while Meta itself reports only about **4% market leverage ratio**.

How Does the Structure Work? It's Complex and Opaque.

- Bankruptcy-remote SPVs issue debt backed by contractual claims on future lease payments.
- Meta, sole tenant, signs a sequence of **five four-year leases**, beginning in 2029 and extending through the bond's maturity.
- Every 4 years, Meta can terminate some or all of the leases.
- If it terminates, assets are offered for sale. Meta provides **Residual Value Guarantee**.
- RVG preserves much of the **long-duration credit support** required by lenders, while offering Meta some operational and strategic **flexibility**.

Beignet Investor LLC organization structure

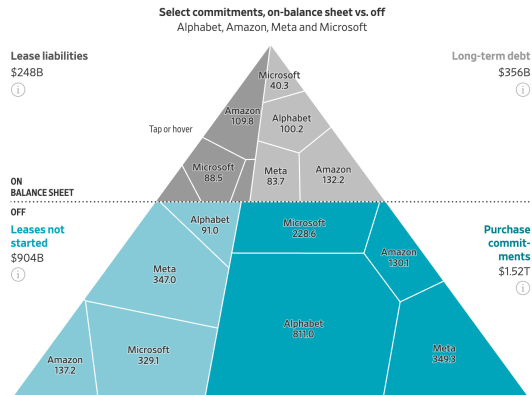


Source: S&P Global Ratings.
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Accounting Arbitrage: A Probability Vacuum

- Under GAAP, Meta does **not** need to recognize the future lease obligations **nor** the residual value guarantee on its balance sheet before the relevant lease or guarantee becomes effective.
- Yet one of the two will materialize **for sure!**
- Meta's reported leverage therefore **understates the economic obligations** embedded in the contract.
- Credit ratings do not consider the future lease and RVG obligations in their adjusted leverage ratio calculation. Maybe they should?

Off-balance Sheet Obligations Are Massive



Note: Data are as of each company's most recent quarterly filing and in billions, except where noted.
Source: WSJ analysis of company filings

- Recent WSJ analysis pegs hyperscaler AI off-balance sheet obligations at \$2.4 tr vs. \$0.6 tr in on-balance sheet obligations → only 20% of \$3 tr in DC liabilities are currently on-balance sheet!
- Plus: off-balance sheet construction guarantees for DC assets and power infrastructure

Higher Cost of Debt

- Beignet's debt was issued at a yield of **6.58%**, at least 100 basis points above what Meta would have paid on unsecured corporate debt in Oct 2025.
- Adds \$5 billion of additional interest expense, needs to be recuperated via Meta's lease payments.

So why do it?

The rationale is preservation of an **asset-light corporate profile**.

Meta avoids adding the assets and debt to its own balance sheet, limiting the effect on reported **capital intensity, leverage, and credit metrics**.

For a firm valued partly on high ROIC growth and low capital intensity, those benefits may **outweigh the higher borrowing cost**.

Where Could the Risk Come From?

Demand

AI demand may disappoint, pricing power may wane, hyperscalers may protect utilization of their own facilities before leased capacity.

Technology

AI hardware evolves rapidly. Compute efficiencies and modes may change. A campus financed over decades may contain compute assets whose economic life is only 3–6 years.

Execution

Power, transmission, permits, GPUs, networking equipment, and semiconductor supply are all capacity-constrained. Delays can reduce utilization and raise costs.

Why leverage matters

Debt service is fixed while utilization and residual values are uncertain. High project-level leverage therefore **amplifies relatively modest operational or demand shocks into financial losses.**

How Much Revenue Must This Buildout Generate?

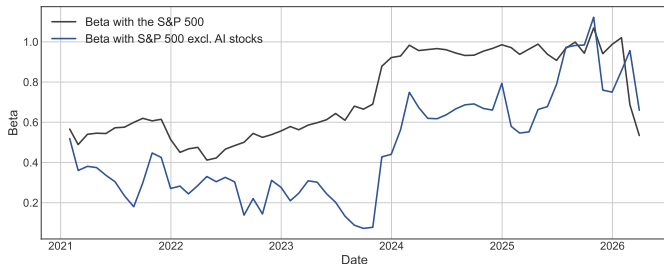
- Target unlevered return on the 182.7GW completed 2025–32: **10% per year**.
- Asset lives: IT at 6 years, non-IT at 20 years. Implies weighted capital charge of **19.37%**.
- Required mature annual operating cash flow: $\$9.61\text{tr} \times 0.1937 = \1.86tr .
- At 50% operating cash-flow margin, required revenue of $\sim$ **\$3.7tr** by 2032
- Amounts to 9.2% of 2032 GDP.
- Amounts to \$5.5 per GPU-hour. Requires **current pricing power to persist** until 2032, even as we add 182.7GW of capacity.
- *For context:* OpenAI + Anthropic revenues $\sim$ \$100bn today $\Rightarrow$ **$\sim$ 80% annual growth** to 2032 to reach \$3.7trn.

The Risk Are More Correlated Than It Looks

- Chip designers, cloud providers, model developers, data center operators, and infrastructure investors increasingly depend on one another through:
 - long-term contracts,
 - strategic investments,
 - leases,
 - financing arrangements.
- A demand shock can therefore propagate through:

AI demand → cloud revenues → lease payments → asset values → credit losses.
- SPVs and structured finance distribute the exposure across many investors without eliminating the underlying risk.

Data Centers Are Not a Hedge Against AI Risk



- Market beta of publicly traded data center REITs has risen from roughly **0.5 to around 1**.
- Their exposure to the non-AI component of the S&P 500 has also increased and is now comparable to their exposure to AI stocks.
- Data centers increasingly look like part of the **same systematic risk complex**, rather than defensive infrastructure.

The Measurement Problem

- The physical capital is spread across:
 - buildings,
 - power infrastructure,
 - networking,
 - GPUs.
- The financial exposure is spread across:
 - corporate balance sheets,
 - leases,
 - JVs,
 - guarantees,
 - project debt,
 - SPVs and private credit.
- Reported hyperscaler capex therefore captures only **part of the total investment**.

Research agenda

Construct measures of AI infrastructure that identify not only **legal ownership**, but who bears the **demand, refinancing, and residual-value risk**.

Conclusion

- ① The AI boom is a **physical capital boom**: approximately **\$10.3 trillion** of investment in 2025–32, or **3.63% of GDP**.
- ② Internal cash flow is no longer sufficient. Financing is shifting toward **leases, JVs, project debt, private credit, structured finance, and SPVs**.
- ③ These structures **expand funding capacity**, but also move leverage and contingent obligations away from hyperscaler balance sheets.
- ④ Hyperion illustrates the template: **roughly 90% project leverage behind a tenant with roughly 4% market leverage**.
- ⑤ The completed buildout requires approximately **\$3.7 trillion of mature annual revenue** under our baseline assumptions.

The key issue is not whether AI infrastructure will be built. It is **how much will be built on what timeline, how it will be financed, and who bears the risk if the economics change**.

Appendix

Appendix: Pipeline Realization Assumptions

Outcome	GW	Share of planned
Completed by 2032	182.7	35.9%
Completed after 2032	117.2	23.0%
Never completed	226.9	44.5%
Planned pipeline	509.0	100.0%

- Realization rates decline with reported completion horizon.
- Rates are lower for projects with imputed capacity.
- Undated projects are treated as early-stage.
- “Never” captures both cancellation and downsizing.

Appendix: Investment Calculation

Let K_t denote GW completed in year t and $c_t = \$41\text{m} \times 1.04^{t-2025}$.

$$I_t = 1,000c_t (0.25K_t + 0.40K_{t+1} + 0.25K_{t+2} + 0.10K_{t+3})$$

- 10% of project cost is spent three years before completion.
- 25% two years before.
- 40% one year before.
- 25% in the completion year.
- Nominal GDP grows at 4% annually from \$30.762 trillion in 2025.
- Cumulative 2025–32 investment: **\$10.279 trillion**.

Appendix: Required Revenue Sensitivity

Required return	Operating cash-flow margin		
	33%	50%	67%
5%	4.65T	3.07T	2.29T
10%	5.64T	3.72T	2.78T
15%	6.72T	4.44T	3.31T

Baseline: 10% return and 50% operating cash-flow margin.

Technology sensitivity

If IT economic life falls from six years to three years, required mature annual revenue rises from approximately **\$3.7 trillion** to **\$6.0 trillion**.