

CASE SOLUTION

Big Tech's \$650B bet: solution

A worked solution to the AI capex case. The numbers say reject; the interesting part is working out what would have to be true for them to say build.

All amounts are in billions of dollars unless stated. Present values use unrounded discount factors; the factors shown are rounded to four places.

Part 1: A \$48 billion data center

1. Depreciation

Straight-line to zero over 8 years: $D = 48/8 = 6.0$ per year.

2. Pro forma and operating cash flow

	YEARS 1 TO 3	YEARS 4 TO 6	YEARS 7 AND 8
Revenue	4.000	12.000	18.000
Operating costs	-1.500	-4.000	-6.000
Depreciation	-6.000	-6.000	-6.000
EBIT	-3.500	2.000	6.000
Taxes at 21%	0.735	-0.420	-1.260
Net income	-2.765	1.580	4.740
Add back depreciation	6.000	6.000	6.000
OCF	3.235	7.580	10.740

In Years 1 to 3 the project loses money on paper, yet throws off 3.235 of cash a year. The tax line is a positive 0.735 because the loss shelters 3.5 of Alphabet's other income from the 21% tax. And depreciation is a charge for cash spent in Year 0, so you add it back: $(4 - 1.5 - 6)(1 - 0.21) + 6 = 3.235$. Negative EBIT does not mean negative cash flow.

3. Cash flows and NPV

YEAR	CASH FLOW	FACTOR AT 10%	PRESENT VALUE	CUMULATIVE CASH FLOW	CUMULATIVE PV
0	-48.000	1.0000	-48.000	-48.000	-48.000
1	3.235	0.9091	2.941	-44.765	-45.059
2	3.235	0.8264	2.674	-41.530	-42.386
3	3.235	0.7513	2.431	-38.295	-39.955
4	7.580	0.6830	5.177	-30.715	-34.778
5	7.580	0.6209	4.707	-23.135	-30.071
6	7.580	0.5645	4.279	-15.555	-25.792
7	10.740	0.5132	5.511	-4.815	-20.281
8	10.740	0.4665	5.010	5.925	-15.271

The present values of Years 1 to 8 sum to 32.729, so

$$\text{NPV} = -48.000 + 32.729 = -15.271$$

The project destroys about **\$15.3 billion** of value at a 10% cost of capital. The present value of everything it earns covers only 68% of what it costs.

4. IRR

Add up the cash flows without discounting: $-48 + 3(3.235) + 3(7.58) + 2(10.74) = +5.925$. So the NPV is positive at 0% and negative at 10%, and the IRR lies between them. Solving (Excel's IRR, or a financial calculator) gives an **IRR of 2.18%**, well below the 10% WACC. The project returns barely more than its money back over eight years.

5. Payback

Use the last two columns of the table in question 3. The cumulative cash flow turns positive during Year 8: payback is $7 + 4.815/10.740 = 7.45$ years, in an 8-year project. On a discounted basis the project **never** pays back: the cumulative present value ends at -15.271, which is the NPV.

6. Decision

MEASURE	RESULT	TEST	VERDICT
NPV	-15.27	above zero?	Reject
IRR	2.18%	above the 10% WACC?	Reject
Payback	7.45 years	early in an 8-year life?	Reject
Discounted payback	never	within the life?	Reject

Every measure says reject. On these assumptions the project does not earn its cost of capital.

7. Sensitivity to revenue

Scale revenue in every period and keep costs fixed. Depreciation does not change, so each OCF rises by the extra revenue times $(1 - 0.21)$.

REVENUE	OCF, YR 1-3	OCF, YR 4-6	OCF, YR 7-8	NPV	IRR
Base	3.235	7.580	10.740	-15.27	2.18%
1.5 times	4.815	12.320	17.850	4.48	11.96%
2 times	6.395	17.060	24.960	24.23	19.49%

OCF is linear in revenue, so NPV is too: each extra 0.5 times base revenue adds 19.75. NPV reaches zero at about **1.39 times** base revenue. Revenue 39% above plan flips the verdict, and twice plan makes this a \$24 billion winner. The decision lives in the revenue forecast.

8. Why build anyway?

The model asks whether one data center, on these forecasts, is worth its cost. A company guiding to \$175 billion or more of capex is answering a broader question. What the standalone model leaves out:

- **Strategic and competitive value.** If AI infrastructure turns out to be a market where scale wins, not building means losing position that cannot be bought back later. The cost of not investing belongs in the comparison, and here it is set at zero.
- **Option value.** A data center is a platform. Owning one gives the right, not the obligation, to expand, to launch products that do not exist yet, or to repurpose capacity. A static DCF treats the cash flows as fixed and misses that flexibility.
- **Synergies.** The capacity also serves Search, YouTube, advertising and the existing cloud business, so the incremental cash flow to Alphabet can far exceed the complex's own revenue.
- **The forecast itself.** Question 7 shows the answer turns on revenue. Management may simply believe a higher forecast than the one in the case.

None of this makes the NPV rule wrong; it means the model's cash flows are not all the incremental cash flows. The useful output is not "reject" but the list of what has to be true for the investment to work: revenue 39% above plan, or strategic value worth at least \$15 billion today.

Part 2: Paying for it

9. Ranking the funding options

One defensible ranking; in practice a company this size uses several sources at once.

RANK	OPTION	REASONING
1	(B) Issue bonds	Cheapest marginal source. The after-tax cost is about 3.8% (question 10), against a cost of equity of 10% or more, because interest is tax-deductible. An AA+ borrower has deep, ready access to the bond market. Alphabet did this in February 2026.
2	(A) Use cash on hand	No issuance costs, no dilution, no new obligations. But the cash has an opportunity cost: it is the company's reserve for acquisitions, downturns and the next opportunity. Better for part of the funding than all of it.

RANK	OPTION	REASONING
3	(C) Cut the buyback	2024 buybacks of about \$62 billion alone exceed the \$48 billion needed. No new debt and no dilution. The cost is the signal: shareholders who own the stock for its cash returns may read a cut as bad news, so the company has to explain why the investment is a better use of the cash.
4	(D) Issue new shares	Last resort. It dilutes existing holders, carries underwriting costs, and tells the market management thinks the stock is fully priced (otherwise why sell it?). A company with \$73 billion of free cash flow has no reason to do this.

Pecking order theory (internal funds, then debt, then equity) would put (A) and (C) before (B). Debt comes first above because, for an AA+ borrower, the tax shield makes it cheaper than shareholders' cash. Either order is defensible; new equity comes last on any view.

10. Cost of debt, and what happens when you borrow more

After-tax cost of debt on the February 2026 issue, at its 4.80% average coupon: $4.80\% \times (1 - 0.21) = 3.79\%$.

That is the rate for a company that borrows little. Borrow \$100 billion or more and three things change:

- **The cost of debt rises.** More debt against the same cash flows means more default risk. Rating agencies may downgrade, and lenders demand a higher coupon on new issues.
- **The cost of equity rises too.** Leverage makes the remaining equity riskier, because shareholders are paid after a larger pile of debt (Modigliani-Miller Proposition II).
- **The trade-off.** Up to a point, the tax shield on interest adds value. Past that point, the expected costs of financial distress grow faster than the tax savings. What \$20 billion cost at 4.8% says little about the next \$100 billion.

11. Same decision, different reactions

The market runs its own NPV on each company, and its verdicts differ for reasons like these:

- **A visible path to cash flow.** Meta's shares jumped more than 10% after hours while it guided capex up from \$72 billion to \$115 to \$135 billion. Its AI spending feeds straight into ad targeting, a business investors already understand and can see improving. The cash flows are credible.
- **Whether spending outruns cash generation.** Amazon's planned capex of about \$200 billion is more than five times its 2024 free cash flow, which pushes its free cash flow toward negative. Investors worry about funding, not just returns.
- **Credibility and timing.** Meta and Microsoft reported on the same evening, January 28, 2026: Meta's shares jumped more than 10% after hours, and Microsoft's closed 10% lower the next day. The same announcement is good news if investors believe the project is positive-NPV and bad news if they do not. A buyback cut signals that management has a better use for the cash; whether that signal is welcome depends on whether investors believe it.

The stock price is the market's estimate of whose assumptions are right.