Completing the DCF with LLMs

ApexCo mini-case | cost of capital, EV-to-equity bridge, and valuation checks

This handout continues the ApexCo workflow from Part I. The operating forecast and continuing-value story are already in place. The goal here is to **complete the DCF**: estimate a company-specific cost of capital, convert enterprise value into common-equity value, and pressure-test the result with consistency checks, implied multiples, and scenario analysis.

Workflow in one sentence

Forecast first, discount second, bridge third, pressure-test last. The LLM is most useful when it helps retrieve and organize valuation evidence from filings and market-input sheets, classify bridge items cleanly, and audit the setup for internal consistency before the analyst finalizes the value range.

1. Build WACC evidence
risk-free rate, peer beta logic, cost of debt, and target capital structure

2. Build the bridge
enterprise value, debt-like claims, excess cash, and diluted shares

3. Audit consistency
leases, SBC, cash treatment, share count, and matching rules

4. Pressure-test value
implied multiples, bull/base/bear bundles, and sensitivity ranges

1. Overview | What carries forward from Part I

Carry-forward forecast inputs from the forecasting handout

The ApexCo operating forecast already supplies the cash-flow engine for the DCF. This handout does **not** rebuild revenue, margin, or reinvestment from scratch. Instead, it carries forward the forecast and terminal assumptions, then asks three new questions: **(i)** what discount rate matches those cash flows, **(ii)** what claims must be bridged out before value belongs to common equity, and **(iii)** how robust is the value to alternative assumptions.

Carry-forward item	Illustrative value from the Part I ApexCo build
2029 revenue	639.3 (about 640)
2029 NOPLAT margin	9.6%
2029 NOPLAT	61.4
2030 mature growth rate g	3.0%
2030 mature RONIC	12.5%
2030 FCFF / NOPLAT conversion	$1 - g/\text{RONIC} = 76.0\%$
2030 FCFF	about 48.0

Why this matters

The cost of capital, EV-to-equity bridge, and valuation checks must all be applied to the **same operating story**. If the operating forecast changes, the WACC discussion, bridge items, and reasonableness checks must be revisited too.

1.1 What to feed the LLM

Source	Sections to feed	Why it matters now
2024 10-K	Business; MD&A; Liquidity and Capital Resources; debt note; lease note; share-based compensation note; EPS / equity note	Company facts for leverage, lease obligations, liquidity needs, and dilution
Q1 2025 10-Q	MD&A; liquidity; borrowings; leases; shares outstanding; equity compensation updates	Near-term updates to debt, cash, lease liabilities, and share count
FY2024 earnings release	Guidance, free-cash-flow commentary, net debt discussion, capital allocation language	Management framing of financing needs and near-term cash-use priorities
Q4 / FY2024 call transcript	CFO commentary on leverage policy, debt capacity, cash priorities, and risk	Useful language for target capital structure and scenario design
Illustrative market-input sheet	Treasury yield, ERP assumption, peer betas, peer capital structure, indicative debt spread, peer operating multiples	Market inputs that do **not** come from the filings themselves

File boundary

Use filings for **company facts**. Use the market-input sheet for **market data**. A productive LLM workflow keeps those two evidence types separate so the analyst can see which inputs come from disclosure and which come from current market conditions.

2. Step 1 | Assemble company-specific WACC evidence

LLM prompt | Assemble company-specific WACC evidence

You are supporting ApexCo's WACC build. Use the 2024 10-K (MD&A; Liquidity and Capital Resources; debt note; lease note), the Q1 2025 10-Q (liquidity; borrowings; leases), the FY2024 earnings release, the Q4 / FY2024 call transcript, and the illustrative market-input sheet. Retrieve and organize only the evidence relevant to **risk-free rate choice**, **peer / beta selection**, **cost of debt**, and **target capital structure**. Return a concise table with the columns **WACC input**, **Evidence retrieved**, **Why it matters**, and **Source anchor**. Do **not** calculate WACC yet. Do **not** use market inputs from memory.

WACC input	Evidence retrieved	Why it matters	Source anchor
Risk-free rate	The valuation is being run in nominal dollars, so the risk-free rate should be a long-duration nominal government yield rather than a historical average company borrowing rate. The market-input sheet uses a 10-year U.S. Treasury yield of 4.25%.	WACC must match the currency and inflation convention of FCFF.	Market-input sheet A

WACC input	Evidence retrieved	Why it matters	Source anchor
Peer beta set	ApexCo's economics combine equipment cyclicality, recurring service, and controls / software exposure. The peer set therefore needs to reflect business mix rather than a single hardware archetype.	Beta should capture operating risk before leverage is applied.	10-K excerpt 1; market-input sheet B
Cost of debt	ApexCo's filings show a modest debt load and ordinary revolving-credit access. The market-input sheet provides a current indicative borrowing spread of 150 bps over the 10-year Treasury, implying a pre-tax borrowing cost near 5.75%.	WACC uses a **current marginal** debt cost, not a stale historical coupon.	10-K excerpt 8; 10-Q excerpt 5; market-input sheet C
Target capital structure	Management frames leverage conservatively, the operating mix is only partly recurring, and the peer set carries moderate leverage. A target mix around 80% equity / 20% debt is supportable for a normal-state ApexCo.	WACC should reflect a sustainable financing mix, not a temporary quarter-end snapshot.	CFO on leverage policy; 10-K excerpt 8; market-input sheet B

2.1 Peer beta normalization

LLM prompt | Normalize peer betas for ApexCo

Using the illustrative peer sheet, prepare a beta-normalization table for ApexCo. For each peer, report the **levered beta**, **debt-to-equity ratio**, **tax rate**, and the implied **unlevered beta**. Then summarize the peer range, identify a sensible central estimate of business risk, and relever that estimate to ApexCo's target debt-to-equity ratio. Return a compact table plus one short paragraph explaining the logic.

Illustrative peer (market sheet)	Levered beta	D / E	Tax rate	Unlevered beta	Why it belongs
ThermaBuild Holdings	1.02	20%	25%	0.89	Equipment-heavy building products exposure
ClimateService Partners	0.88	5%	25%	0.85	More recurring service-oriented mix
ControlMatrix Systems	1.08	25%	25%	0.91	Higher-controls and automation exposure
BalancedAir Group	0.95	10%	25%	0.88	Mixed equipment / service model
		Average unlevered beta		**0.88**	Central estimate of business risk
		ApexCo target D / E		**10%**	Relever to ApexCo's target structure
		ApexCo target levered beta		**0.95**	$0.88 \times (1 + 0.75 \times 0.10) \approx 0.95$

Why use peers at all?

A raw regression beta for the target firm mixes **business risk** with **current leverage** and short-window market noise. Peer betas are not circular logic; they are the **raw observed inputs**. The workflow is to observe peers' equity betas, strip out their leverage to isolate business risk, and then apply ApexCo's target leverage to recover the beta that fits ApexCo's equity.

2.2 Illustrative ApexCo WACC build

Core formulas

$$\text{Cost of equity} = r_f + \beta \times ERP$$

$$\text{WACC} = \frac{E}{D+E} r_e + \frac{D}{D+E} r_d (1 - T)$$

The first formula prices equity risk. The second blends the required returns on equity and debt using **market-value** weights.

Input	Illustrative value	Comment
Risk-free rate	4.25%	Long-duration nominal government yield
Levered beta	0.95	Peer-informed and matched to ApexCo's target leverage
Equity risk premium	5.50%	Coherent market-wide ERP assumption
Cost of equity	9.48%	$4.25\% + 0.95 \times 5.50\%$
Pre-tax cost of debt	5.75%	Current marginal borrowing cost
Tax rate	25.0%	Used to convert debt cost to an after-tax basis
After-tax cost of debt	4.31%	$5.75\% \times (1 - 25\%)$
Target weights	80% equity / 20% debt	Market-value target structure
WACC	**8.45%**	**Illustrative ApexCo discount rate for FCFF**

Common WACC mistakes

Using book-value leverage, using a stale coupon instead of current borrowing cost, copying one noisy regression beta, or discounting FCFF with an equity discount rate can all move valuation materially. A good WACC build is less about formula manipulation than about **matching the right evidence to the right valuation object**.

3. Step 2 | Build the enterprise-value-to-equity-value bridge

What the bridge is doing

Discounting FCFF gives **enterprise value**: the value of the operating business before assigning value to common shareholders. The bridge then subtracts claims that sit ahead of common equity, adds back nonoperating assets not already captured in FCFF, and finally divides by the diluted share count.

3.1 Classify bridge items

LLM prompt | Classify valuation objects and bridge items

You are supporting an FCFF DCF for ApexCo. Using the 2024 10-K (Business; MD&A; Liquidity and Capital Resources; debt, lease, share-based compensation, and EPS / equity notes), the Q1 2025 10-Q (MD&A; liquidity; borrowings; leases; shares outstanding), the FY2024 earnings release, and the Q4 / FY2024 call transcript, classify every valuation-relevant item into four groups: **debt-like claims**, **nonoperating assets**, **operating cash**, and **dilution / share-count items**. Return a concise table with columns: **Item**, **Classification**, **Illustrative amount**, **Why it matters**, and **Source anchor**. Do **not** value the company; build only the bridge map.

Item	Classification	Illustrative amount	Why it matters	Source anchor
Gross debt	Debt-like claim	120.0	Debt holders are senior to common equity and must be bridged out of enterprise value.	10-K excerpt 8; 10-Q excerpt 5
Lease liabilities	Debt-like claim	20.0	Lease obligations behave like financing claims when the operating business is valued on a lease-adjusted basis.	10-K excerpt 9; 10-Q excerpt 6
Other fixed claims	Debt-like claim	5.0	Small pension / other fixed obligations reduce value available to common shareholders.	10-K excerpt 10
Cash and liquid investments	Balance-sheet asset	55.0	Reported cash is the starting point, but not all of it is excess.	10-Q excerpt 4
Required operating cash	Operating cash	25.0	Cash is needed to support working capital seasonality, payroll, and operating flexibility.	CFO on liquidity; 10-Q excerpt 4
Excess cash	Nonoperating asset add-back	30.0	Only the surplus over operating needs belongs in the add-back.	Derived from cash minus operating-cash requirement
Diluted shares outstanding	Share-count item	72.6	Per-share value must reflect options, RSUs, and other common-equity claims.	10-Q excerpt 7; 10-K excerpt 11

Excess cash is not all cash

ApexCo carries cash for ordinary seasonality and working-capital volatility. The bridge therefore adds back only the cash that is **not needed for operations**. In this teaching case, reported cash of 55.0 less required operating cash of 25.0 produces excess cash of **30.0**.

3.2 Complete the DCF and bridge to equity

From Part I forecast to enterprise value

Using the carried-forward ApexCo forecast, the 8.45% WACC above, and the 3.0% / 12.5% continuing-value assumptions from Part I, the operating DCF produces an illustrative enterprise value of about **739.6**. The split below is rounded for teaching simplicity.

Valuation bridge item	Illustrative value	Comment
Present value of 2025–2029 FCFF	147.6	Discounted at the 8.45% WACC
Present value of continuing value	592.0	Rounded present value of mature-state cash flows
Enterprise value	**739.6**	**Value of the operating business**
+ **Excess cash**	30.0	Add back nonoperating cash surplus
- Gross debt	(120.0)	Debt-like claim
- Lease liabilities	(20.0)	Debt-like claim
- Other fixed claims	(5.0)	Debt-like claim
Common-equity value	**624.6**	**Value attributable to common shareholders**
Diluted shares outstanding	72.6	Basic shares plus in-the-money dilution
Value per share	**$8.60**	**624.6 / 72.6**

Why the bridge matters

A good DCF can still produce a bad equity valuation if the bridge is wrong. Missing lease liabilities, adding back all cash, or using an undiluted share count can move the per-share result as much as a change in WACC.

4. Step 3 | Run a consistency audit

Why this step belongs in the workflow

Many valuation mistakes are not forecasting mistakes; they are **consistency mistakes**. A productive LLM pass checks whether operations, WACC, bridge items, and share count all tell the same economic story.

LLM prompt | Run a consistency audit on the valuation setup

You are auditing ApexCo's valuation setup for internal consistency. Use the completed operating forecast, the WACC build, the EV-to-equity bridge, and the filings that support leases, cash, debt, and share-based compensation. Identify any places where the setup could double count or omit value. Return a concise audit table with columns: **Issue**, **Diagnostic question**, **ApexCo base-case treatment**, and **Why it matters**. Focus on leases, stock-based compensation, excess cash, debt cost, and diluted share count.

Issue	Diagnostic question	ApexCo base-case treatment	Why it matters
Leases	Are leases treated the same way in operations, WACC thinking, and the bridge?	Lease liabilities are treated as debt-like claims in the bridge; the operating view is interpreted on a lease-aware basis.	A mismatch can double count or omit financing-like obligations.
Stock-based compensation	Is SBC expensed while dilution is also captured in the share count?	SBC remains in operating expense and diluted shares include options / RSUs.	Ignoring either the expense or the dilution overstates value per share.
Cash	Is only excess cash added back?	Reported cash is split into operating cash and excess cash; only $30.0 is added back.	Adding all cash overstates common-equity value.
Debt cost and weights	Are the debt cost and capital-structure weights forward-looking and market based?	The handout uses a current marginal debt cost and target market-value weights.	Historical coupons or book weights can distort WACC.
Diluted shares	Does the denominator reflect options, RSUs, and similar claims?	Per-share value uses 72.6 diluted shares rather than basic shares alone.	Omitting dilution is a common source of overvaluation.

Quick rule

If an item is adjusted in the operating forecast, ask where it appears again in WACC, the bridge, or the share count. If the same economic item shows up twice, the valuation is probably being distorted.

5. Step 4 | Pressure-test the valuation

5.1 Implied terminal multiple check

LLM prompt | Build a valuation reasonableness sheet

Using the completed DCF output, the continuing-value assumptions, and the illustrative market-input sheet, calculate the **implied terminal EV / NOPLAT multiple** in the DCF and compare it with the peer operating-multiple range in the market sheet. Return a compact table with columns: **Check**, **Illustrative value**, **Benchmark**, and **Interpretation**. Use only enterprise multiples when checking an FCFF DCF.

Check	Illustrative value	Benchmark	Interpretation
Implied terminal EV / NOPLAT	13.9x	Peer EV / NOPLAT range of about 12.8x to 15.1x	The DCF's continuing value implies a mature operating multiple that sits inside the peer range rather than far above it.
Matching rule	Enterprise multiple	Use EV / NOPLAT, EV / EBIT, or EV / EBITDA	Do not use P / E to check a terminal enterprise value.

How to use this check

The point is not to force the DCF to equal the peer multiple. The point is to ask whether the **valuation level hidden inside the terminal value** looks commercially believable for a mature ApexCo.

5.2 Scenario bundles and sensitivity

LLM prompt | Propose coherent ApexCo scenario bundles

You are pressure-testing an ApexCo valuation. Using the completed forecast build, the WACC assumptions, the EV-to-equity bridge, and the continuing-value setup, propose coherent **bull**, **base**, and **bear** scenario bundles. Each scenario should change a connected set of assumptions across **growth**, **margin**, **reinvestment**, **WACC**, and **continuing value**; it should not change only one isolated input. Return a concise table with columns: **Scenario**, **Operating story**, **Key assumption shifts**, and **Why the bundle is internally coherent**. Do **not** assign probabilities.

Scenario	Operating story	Key assumption shifts	Why the bundle is internally coherent
Bull	Controls attach rises faster, service contracts deepen, and automation benefits show up earlier.	Slightly lower WACC, faster margin normalization, earlier fade in capex intensity, slightly higher mature growth.	The same operational improvements that raise margins also justify better capital efficiency and a stronger terminal profile.
Base	Growth normalizes gradually, Service and Controls gain mix share, and capex remains elevated near term before fading.	WACC of 8.45%, terminal growth of 3.0%, terminal RONIC of 12.5%, moderate bridge adjustments.	This is the internally consistent extension of Part I operating story.
Bear	Backlog normalization lasts longer, attach-rate improvement stalls, and automation underdelivers.	Higher WACC, slower margin improvement, reinvestment stays elevated longer, lower mature growth.	Weaker operating outcomes and weaker continuing-value economics move together rather than in opposite directions.

Sensitivity table

The table below holds the explicit-period operating forecast fixed and varies the two assumptions that most strongly affect continuing value: **WACC** and **steady-state growth**. The middle column uses the base-case WACC of 8.45% exactly.

g / **WACC**	**7.95%**	**8.20%**	**8.45%**	**8.70%**	**8.95%**
2.0%	8.79	8.34	7.94	7.56	7.21
2.5%	9.16	8.67	8.22	7.80	7.42
3.0%	9.60	9.05	8.55	8.09	7.67
3.5%	10.14	9.50	8.94	8.42	7.95
4.0%	10.81	10.07	9.41	8.82	8.29

Reading the range

The table does not tell the analyst which cell is "correct." It shows how much of the valuation range comes from assumptions about discount rate and mature growth. The job is to defend a **plausible region**, not to overstate the precision of one point estimate.

6. Closing takeaways

A productive LLM-assisted valuation workflow for ApexCo has four distinct moves:

1. **Build the WACC evidence map.** Separate filing-based evidence from market inputs, and use peer betas only after unlevering and relevering them to ApexCo's target structure.
2. **Build the EV-to-equity bridge.** Discount FCFF to enterprise value, then subtract debt-like claims, add excess cash, and divide by diluted shares.
3. **Audit consistency.** Leases, stock-based compensation, cash, debt cost, and diluted shares must all tell the same economic story.
4. **Pressure-test the result.** Use implied operating multiples, scenario bundles, and WACC / growth sensitivity to judge whether the value range is believable.

Bottom line

The strongest role for LLMs in Part II is not choosing a magic discount rate or announcing a stock price. It is **retrieving**, **classifying**, and **auditing** the evidence that supports cost of capital, bridge items, and valuation checks. The analyst still owns the judgment about market inputs, leverage targets, excess cash, and the shape of the value range.

A. Appendix | Original source excerpts and illustrative market-input sheet

The body of this handout reorganizes the ApexCo material by **valuation workflow**. This appendix restores the source view. The packet excerpts below are grouped by data source; the final subsection adds an **illustrative market-input sheet** that mimics the kind of external data an analyst would usually pull from Bloomberg, FactSet, or Capital IQ. Because ApexCo is hypothetical, the market sheet is **synthetic but internally consistent** with the teaching case.

A.1 2024 Form 10-K excerpts

10-K excerpt 1 | Unit of analysis and revenue definitions

"ApexCo manages its business through three operating segments: Equipment Systems, Service & Parts, and Controls Software. Equipment Systems includes rooftop packaged units, chillers, air handlers, and heat-pump systems sold through distributors and direct channels. Service & Parts includes maintenance contracts, replacement parts, repair services, and selected retrofit work. Controls Software includes building controls software, analytics, monitoring subscriptions, and retrofit modules."

10-K excerpt 6 | Capital projects

"Capital expenditures increased to $45 million in 2024, primarily to automate selected assembly lines at the Ohio plant and expand heat-pump capacity. Management expects the strategic capex cycle to peak in 2025 before moderating."

10-K excerpt 8 | Liquidity and debt profile

"At year-end 2024, ApexCo had $120 million of gross debt outstanding, primarily under a senior revolving-credit facility and term borrowings. The company maintained covenant headroom throughout the year and continues to describe its leverage posture as conservative relative to its cyclical equipment exposure."

10-K excerpt 9 | Lease obligations

"The company recognized lease liabilities related to facilities, service vehicles, and selected equipment. Total lease liabilities were approximately $20 million at fiscal year-end 2024."

10-K excerpt 10 | Other fixed claims

"In addition to funded debt and lease obligations, ApexCo reported approximately $5 million of other fixed claims, primarily related to supplemental pension and similar long-duration obligations."

10-K excerpt 11 | Share-based compensation and dilution

"Share-based compensation expense is recognized in operating expense. Diluted earnings-per-share calculations include the effect of in-the-money options, RSUs, and other share-based awards when dilutive."

A.2 FY2024 earnings release excerpts

Earnings release excerpt 1 | 2025 company guide

"For fiscal 2025, ApexCo expects consolidated revenue growth of 5% to 7%, adjusted operating margin that is flat to up modestly versus fiscal 2024, and free cash flow that remains temporarily constrained by strategic capital spending."

Earnings release excerpt 4 | Capex framing

"Fiscal 2025 is expected to represent the peak year of strategic capital spending. Beginning in 2026, capital expenditures should trend closer to depreciation plus modest growth investment."

Earnings release excerpt 5 | Net debt and liquidity framing

"ApexCo ended the year with ample liquidity and modest net debt. Management continues to prioritize investment in automation and disciplined balance-sheet flexibility over aggressive leverage."

A.3 Q4/FY2024 earnings call excerpts

CFO on leverage policy

"We do not manage the balance sheet to maximize debt. The right frame for ApexCo is moderate leverage with room for working-capital seasonality and for the remaining automation spend in 2025."

CFO on liquidity and excess cash

"We want to keep enough cash on hand to support normal seasonality, payroll, supplier commitments, and execution flexibility. Cash above that operating buffer can be thought of as surplus to the core business."

CEO on capital allocation

"Our first call on capital is funding the operating plan. After that, the priorities are balance-sheet resilience and selective investment in the installed base and controls opportunity."

A.4 Q1 2025 10-Q excerpts

10-Q excerpt 4 | Cash and liquidity

"At quarter-end, cash and cash equivalents plus short-term liquid investments totaled approximately $55 million. Management continues to operate with a minimum liquidity buffer to support seasonal working-capital swings and operating flexibility."

10-Q excerpt 5 | Borrowings update

"Gross borrowings remained approximately $120 million during the quarter. The company did not signal any change in financing strategy and continued to characterize leverage as modest."

10-Q excerpt 6 | Lease update

"Lease liabilities remained near $20 million, reflecting facility and vehicle leases with no unusual changes relative to year-end."

10-Q excerpt 7 | Share-count update

"Basic shares outstanding were approximately 70.8 million. Including dilutive options and RSUs, diluted shares were approximately 72.6 million."

A.5 Illustrative external market-input sheet (commercial-database style)

This sheet is synthetic. It is designed to look like the type of outside information an analyst might retrieve from a commercial database when valuing a hypothetical company such as ApexCo.

Market input	Illustrative value	Comment
10-year U.S. Treasury yield	4.25%	Nominal risk-free anchor
Equity risk premium	5.50%	Market-wide ERP assumption
Indicative ApexCo debt spread	1.50%	Synthetic spread over the Treasury for current borrowing cost
Implied pre-tax cost of debt	5.75%	4.25% + 1.50%

Illustrative peer	Levered beta	D / E	Unlevered beta	EV / NOPLAT	Comment
ThermaBuild Holdings	1.02	20%	0.89	12.8x	Equipment-heavy building products peer
ClimateService Partners	0.88	5%	0.85	14.6x	Recurring service-heavy peer
ControlMatrix Systems	1.08	25%	0.91	15.1x	Controls / automation peer
BalancedAir Group	0.95	10%	0.88	13.2x	Mixed HVAC systems and service peer