Forecasting in DCF Models with LLMs

ApexCo mini-case | from packet retrieval to explicit forecast and continuing value

This handout shows a practical workflow for using LLMs as a **co-pilot** when the analyst is facing an unfamiliar business and a large source packet. The aim is not to let the model invent a forecast. The aim is to use the model where scale and organization matter most: extracting the company's **business architecture**, retrieving a **fact bank** tied to company-specific KPIs, organizing **historical numerical data**, and preparing the analyst to make disciplined judgments about growth, margins, reinvestment, ROIC, FCFF, and continuing value.

Workflow in one sentence

Architecture first, evidence second, judgment third, DCF last. The model first turns raw disclosures into a company-specific scaffold—segments, monetization, KPIs, and driver tree. That scaffold is then fed back into the model to retrieve a facts bank organized by topic. Only after that retrieval step does the analyst translate evidence into explicit forecast assumptions and a continuing-value story.

1. Extract architecture
segment engine table, blueprint, monetization map, KPI ledger, driver tree

2. Retrieve fact banks
growth, margin, reinvestment, and continuing-value evidence tied to company KPIs

3. Translate into assumptions
human + AI collaboration on ranges, point estimates, fades, and falsifiers

4. Build the DCF
revenue, NOPLAT, ROIC, FCFF, and continuing value as one connected system

1. Why the workflow starts with business architecture

Why step 1 is crucial for step 2

An LLM retrieves evidence more accurately when the prompt uses the **company's own economic vocabulary**. If the prompt simply asks for "facts about growth" or "facts about margins," the search space is too broad: the model may mix segments, miss the relevant KPIs, and blend structural evidence with one-quarter noise. Architecture extraction narrows the search space. It gives the model precise retrieval handles such as **Equipment backlog**, **installed base**, **service revenue under contract**, **controls attach rate**, **Net OWC / sales**, and the **capex cycle**. Those terms then become the anchors for the fact-bank stage.

Task	Weak generic prompt	Strong architecture-aware prompt	Why the stronger prompt works
Growth retrieval	Find facts about growth.	Retrieve structural and near-term evidence for **Equipment backlog normalization**, **Service contract share and renewal**, and **Controls attach and retrofit demand**.	The prompt uses the company's actual segments and KPIs, so retrieval targets the right revenue branches and avoids generic management language.
Margin retrieval	Find facts about margins.	Retrieve evidence on **Service / Controls mix**, **price-cost**, **automation timing**, and **temporary under-absorption / launch costs**.	The prompt names the mechanisms that actually move ApexCo's margin rather than asking for a vague margin summary.
Reinvestment retrieval	Find facts about cash flow and capital spending.	Retrieve evidence on **Net OWC / sales**, **inventory staging**, **peak 2025 capex**, **D&A lag**, and **capital-turnover timing**.	The prompt ties cash flow back to the operating and balance-sheet drivers that matter in a DCF model.

Practical implication

The first LLM pass should not try to forecast. It should create a **retrieval scaffold**. Once that scaffold exists, later prompts can ask for evidence on company-specific terms rather than abstract terms like growth, margin, reinvestment, or risk.

2. Step 1 | Extract the business architecture

2.1 Segment engine table

LLM prompt | Extract the segment engine table

You are supporting an equity analyst who is seeing ApexCo for the first time. Read the source packet and identify the company's distinct **economic engines**. For each engine, specify (i) who pays and what is sold, (ii) the engine's economic role and what makes it different from the others, and (iii) why a DCF model should forecast it separately. Use only packet-supported language, prefer concrete commercial terms over generic strategy language, and collapse overlapping descriptions into the cleanest segment structure supported by the disclosures. Return one concise table with the columns **Engine**, **Who pays / what is sold**, **Economic role**, and **Why the model separates it**.

Engine	Who pays / what is sold	Economic role	Why the model separates it
Equipment Systems	Distributors and end customers buy packaged HVAC systems, chillers, air handlers, and heat pumps.	Largest revenue engine; lower margin, more cyclical, and highest working-capital burden.	It needs its own growth, margin, and working-capital logic because replacement demand, backlog, utilization, and price-cost matter here more than in the other engines.
Service & Parts	Building owners and facilities managers buy maintenance contracts, repairs, and replacement parts.	Recurring engine with steadier growth and stronger margin quality.	It stabilizes the company, changes the margin story, and depends on installed-base monetization rather than project timing.
Controls Software	New placements and legacy customers buy controls software, analytics, monitoring subscriptions, and retrofit modules.	Highest incremental margin; supports mix uplift and economic durability.	It explains why mix can improve, why capital intensity is lighter, and why mature returns can stay above the cost of capital.

2.2 Business Model Blueprint

LLM prompt | Extract the business blueprint

Using the same packet and the segment engine table already built, produce a compact business blueprint for ApexCo. Summarize the company in four lines only: **customers**, **value delivered**, **cost structure**, and **key assets**. Keep the language commercially precise, grounded in the packet, and specific enough to guide later forecasting work. Avoid generic strategy language and do not discuss valuation. Return a two-column table: **Blueprint line** and **ApexCo output**.

Blueprint line	ApexCo output
Customers	Distributors, contractors, building owners, and facility operators across education, healthcare, office, and light industrial end markets.
Value	Uptime, energy efficiency, climate control, and analytics; in practice this means reliable HVAC performance, lower energy usage, and better monitoring.
Cost structure	Materials, manufacturing labor, freight, field service labor, and ongoing software development; plant utilization and automated capacity also matter.
Key assets	Installed base, service network, controls platform, distributor relationships, and the Ohio automation / heat-pump capacity build.

2.3 Monetization map → revenue tree

LLM prompt | Extract the monetization map

Convert the packet into a monetization map that can directly support a revenue tree. For each distinct revenue line, identify (i) who pays, (ii) the commercial pricing logic, and (iii) the forecast branch implied by that logic. Distinguish clearly between how revenue is monetized and what operational variables will later drive the forecast. Use only packet-supported language and return one concise table with **Revenue line**, **Who pays**, **Pricing logic**, and **Forecast branch**.

Revenue line	Who pays	Pricing logic	Forecast branch
Equipment Systems	Distributors, contractors, and end customers	Units × price / mix	Market demand + replacement cycle + share + backlog normalization
Service & Parts	Building owners and facilities managers	Contracts + renewal + service tickets + parts pricing	Installed-base growth + contract share + price
Controls Software	New placements + legacy installed base	Attach rate + modules + subscriptions + retrofits	Placements + attach + cross-sell + renewal

2.4 KPI ledger

LLM prompt | Extract the KPI ledger

Identify the limited set of KPIs or proxies that an analyst should carry into the ApexCo model. For each KPI, state (i) what it measures, (ii) why it matters economically, and (iii) where it appears in the packet. Prefer operating metrics that control growth, margins, reinvestment, or durability; avoid generic ratios unless the packet makes them decision-useful. Return a concise ledger with the columns **KPI / proxy**, **What it measures**, **Why it matters economically**, and **Packet anchors**.

KPI / proxy	What it measures	Why it matters economically	Packet anchors
Equipment backlog	Near-term Equipment demand already committed	Controls 2025 Equipment growth and inventory timing	10-K risk factor; Q1 2025 10-Q excerpts 1–2
Installed base	Future service and controls opportunity	Supports Service growth, Controls growth, and terminal durability	10-K excerpt 3; historical table
Service revenue under contract	Visibility and recurring quality	Supports margin stability and downside protection	10-K excerpt 3; historical table
Service contract renewal rate	Retention of the recurring base	Helps assess growth quality and risk	10-K excerpt 3; historical table
Controls attach rate	Software penetration on new placements	Drives mix uplift, incremental margin, and terminal economics	10-K excerpt 4; historical table
Net OWC / sales	Cash tied up in operations	Shapes reinvestment, turnover, and FCFF timing	historical table; 10-Q excerpt 4
Capex and D&A	Capacity build versus maintenance run rate	Shapes reinvestment, turnover, and FCFF	10-K excerpt 6; earnings release excerpt 4; 10-Q excerpt 5
Segment margin before corporate costs	Engine-level operating quality	Helps map the NOPLAT margin path and mix effects	historical table; earnings call commentary

2.5 Driver tree

LLM prompt | Translate the architecture into a driver tree

Using the segment engine table, business blueprint, monetization map, and KPI ledger, convert ApexCo's business architecture into a compact **driver tree**. Organize the most decision-useful nodes under **growth**, **margins**, **reinvestment**, and **risk / sensitivity**, and identify the main forecast knob each node influences. Keep the tree compact, causal, and model-oriented rather than descriptive. Return one table with **Driver branch**, **Core nodes**, and **Main forecast knobs**.

Driver branch	Core nodes	Main forecast knobs
Growth	Replacement demand; backlog normalization; contract penetration; installed-base monetization; controls attach; retrofit demand	Segment revenue growth, mix, and company top-line growth
Margins	Service / Controls mix; price-cost; plant utilization; automation savings; under-absorption / launch costs	NOPLAT margin path and fade speed
Reinvestment	Inventory and receivables; strategic capex; maintenance capex; D&A lag; turnover recovery	Reinvestment, capital turnover, ROIC, and FCFF timing
Risk / sensitivity	Destocking duration; attach-rate stall; automation underdelivery; slower retrofit uptake; price-cost rollover	Downside cases, sensitivity tests, and terminal RONIC discipline

2.6 Historical numerical bank

LLM prompt | Extract forecast-ready history

Extract forecast-ready history from the packet and organize it for model building. Return one table for **core operating history** and one table for **segment and KPI history**. Use only figures stated in the packet or directly implied by packet tables; keep labels model-ready; and add a brief note on why each line matters in the forecast. Do not smooth, annualize, or infer numbers that are not supported by the packet.

Core operating history	2022A	2023A	2024A	Why it matters
Revenue	430	465	500	Provides the base year and the top-line trend
EBIT	45.6	51.6	59.0	Shows improving operating quality
EBIT margin	10.6%	11.1%	11.8%	Indicates how mix and pricing flowed through before the forecast period
NOPLAT	34.8	39.5	45.0	Starting point for ROIC and FCFF
Average invested capital	265	291	315	Links the income statement to the capital base
ROIC	13.1%	13.6%	14.3%	Shows the returns built so far
Capex	34	39	45	Identifies the current investment cycle
D&A	25	26	28	Helps distinguish maintenance from growth investment
Net operating working capital	58	63	70	Shows cash absorbed by operations

Segment and KPI history	2022A	2023A	2024A	Why it matters
Equipment revenue	310	330	350	Largest revenue engine
Service & Parts revenue	80	89	100	Recurring engine
Controls revenue	40	46	50	Fastest-growing and highest-quality engine
Equipment segment margin	8.0%	8.6%	9.0%	Lower-margin hardware economics
Service segment margin	18.0%	18.5%	19.0%	Better recurring economics
Controls segment margin	29.0%	29.5%	30.0%	Highest incremental profitability
Installed base (000 systems)	84	90	95	Drives Service and Controls opportunity
Service revenue under contract	56%	58%	61%	Visibility and recurrence
Service contract renewal rate	89%	90%	91%	Retention quality
Controls attach rate	34%	37%	40%	Software penetration and mix uplift
Equipment backlog at year-end	118	123	110	Near-term demand and normalization signal

What the architecture buys you at retrieval time

After this first pass, the model no longer needs to search for abstract ideas like "growth" or "margin." It can search for **ApexCo's own drivers**: replacement demand, backlog normalization, contract share, renewal, controls attach, Net OWC / sales, capex peak, and turnover recovery. That specificity is what makes the next retrieval stage more reliable.

3. Step 2 | Build company-specific fact banks

Now feed the architecture back into the model

The second LLM pass uses the architecture as a retrieval scaffold. The job here is not reasoning. The job is to build a **fact bank**: concise, packet-supported evidence organized by driver and by segment, along with the relevant KPI and historical numerical anchor. The fact bank should make the later reasoning stage easier, not noisier.

3.1 Growth fact bank

LLM prompt | Retrieve and organize a growth fact bank

Using the completed segment engine table, monetization map, KPI ledger, and driver tree as the retrieval scaffold, re-read the packet and build a fact bank for **revenue growth**. Organize the output by revenue branch—**Equipment Systems**, **Service & Parts**, **Controls Software**, and the **company guide**. For each branch, retrieve only packet-supported **structural facts**, **near-term facts**, the relevant **KPI / numerical bank**, and the **packet anchors**. This is a retrieval task, not a forecasting task: do not rank segments, do not set growth rates, and do not interpret beyond the evidence.

Revenue branch	Structural facts	Near-term facts	KPI / numerical bank	Packet anchors
Equipment Systems	About 65% of Equipment revenue is tied to replacement demand; replacement demand is steadier than greenfield demand; Equipment remains the largest revenue engine and the most working-capital intensive.	Year-end backlog declined as lead times normalized; some distributors reduced safety inventory; management says backlog normalization moderates 2025 growth; Q1 Equipment revenue was up 2%.	Equipment revenue: 310 → 330 → 350; backlog: 118 → 123 → 110; Q1 segment growth: +2%.	10-K excerpt 2; 10-K risk factor; earnings release excerpt 2; CEO on demand mix; 10-Q excerpts 1–2
Service & Parts	Service revenue is supported by a 95,000-system installed base; more than 60% of Service revenue is under contract; renewal has remained above 90%; uptime-sensitive end markets support recurring demand.	Management expects Service to outgrow Equipment in 2025; Q1 Service revenue was up 7%; education and healthcare remained resilient.	Service revenue: 80 → 89 → 100; contract share: 56% → 58% → 61%; renewal: 89% → 90% → 91%; Q1 segment growth: +7%.	10-K excerpt 3; earnings release excerpt 2; 10-Q excerpts 1 and 3; CEO on demand mix
Controls Software	Controls attach rose from 34% to 40% in two years; the installed base offers retrofit runway, especially in education and healthcare; controls carries the strongest incremental economics.	Management continues to frame Controls as the fastest-growing business; Q1 Controls revenue was up 11%; retrofit demand was strongest where customers wanted lower energy usage without replacing the full system.	Controls revenue: 40 → 46 → 50; attach rate: 34% → 37% → 40%; Q1 segment growth: +11%.	10-K excerpt 4; earnings release excerpt 2; 10-Q excerpt 1; Head of service on installed-base monetization

Revenue branch	Structural facts	Near-term facts	KPI / numerical bank	Packet anchors
Company guide	The mix is shifting toward Service and Controls, two engines with structurally steadier or faster growth than Equipment.	2025 company guide calls for 5% to 7% consolidated revenue growth; Q1 total revenue was up 5%.	Segment mix in 2024: 70% / 20% / 10%; total revenue: 430 → 465 → 500; Q1 total growth: +5%.	2024 segment mix table; earnings release excerpt 1; 10-Q excerpt 1

3.2 Margin fact bank

LLM prompt | Retrieve and organize a margin fact bank

Using the same architecture scaffold, retrieve the packet evidence most relevant to **margins**. Organize the fact bank by driver topic rather than by source. For each topic, capture the **structural facts**, the **current-period facts**, the most relevant **KPI / numerical bank**, and the **packet anchors**. Keep the output tightly tied to the mechanisms that could move ApexCo's margin—mix, automation / productivity, price-cost, and temporary drag. Do not propose a forecast or a verdict.

Margin driver	Structural facts	Current-period facts	KPI / numerical bank	Packet anchors
Mix quality	Service and Controls carry better segment margins than Equipment; contract and software revenue deepen customer relationships and usually support better economics than hardware-only sales.	Service and Controls are expected to outgrow Equipment in 2025; Q1 consolidated gross margin improved modestly despite temporary offsets.	Segment margins in 2024: Equipment 9.0%, Service 19.0%, Controls 30.0%; 2024 segment mix: 70% / 20% / 10%.	historical tables; earnings release excerpt 2; 10-Q excerpt 1; CEO on medium-term economics
Automation / productivity	The company's cost structure is sensitive to utilization of automated capacity; 2024 capex was directed to Ohio automation and heat-pump expansion.	The Ohio automation program becomes more visible in late 2025 and 2026; future improvement should come more from mix and automation than from pricing alone.	Capex: 34 → 39 → 45; D&A: 25 → 26 → 28.	10-K excerpts 5–6; CFO on price-cost; COO on the capex cycle; CEO on medium-term economics
Price-cost	Pricing discipline is one of the stated margin levers in the 10-K.	Price-cost remained positive in Q4, but the benefit was less pronounced than earlier in 2024.	Historical EBIT margin: 10.6% → 11.1% → 11.8%.	10-K excerpt 5; CFO on price-cost

Margin driver	Structural facts	Current-period facts	KPI / numerical bank	Packet anchors
Temporary drag	Launch costs and temporary under-absorption are normal when new capacity is installed ahead of full volume utilization.	2025 adjusted operating margin is expected to be flat to up modestly because automation savings and service mix gains are partly offset by under-absorption and launch costs; Q1 confirms the same pattern.	Q1 gross margin improved only modestly; 2025 is still the peak year of strategic capex.	earnings release excerpt 3; 10-Q excerpt 1; 10-K excerpt 6; COO on the capex cycle

3.3 Reinvestment, ROIC, and FCFF fact bank

LLM prompt | Retrieve and organize a reinvestment fact bank

Using the same architecture scaffold, retrieve the packet evidence most relevant to **reinvestment, turnover, ROIC, and FCFF timing**. Organize the fact bank by topic rather than by source. For each topic, capture the **structural facts**, the **current-period facts**, the relevant **KPI / numerical bank**, and the **packet anchors**. Keep the causal chain visible from operating setup to balance-sheet intensity to cash-flow timing. Do not forecast.

Topic	Structural facts	Current-period facts	KPI / numerical bank	Packet anchors
Working-capital timing	Equipment is working-capital intensive; inventory and receivables are explicit operating levers.	Inventory increased as components were staged for the heat-pump launch and new automation cells were commissioned; receivables increased with sequential volume improvement.	Net operating working capital: 58 → 63 → 70; 2024 NOWC / sales = 14.0%.	historical financials; 10-Q excerpt 4; Equipment engine description
Capex cycle	Capex increased in 2024 because of Ohio automation and heat-pump capacity; D&A lags the capex cycle.	Management continues to frame 2025 as the peak year of strategic capital spending, with most automation cash outflows occurring before year-end.	Capex: 34 → 39 → 45; D&A: 25 → 26 → 28.	10-K excerpt 6; earnings release excerpt 4; 10-Q excerpt 5
Turnover lag	The investment goes onto the balance sheet before the full revenue and productivity benefit appears.	The Ohio automation program is expected to be most visible in the back half of 2025 and in 2026.	Average invested capital: 265 → 291 → 315; ROIC: 13.1% → 13.6% → 14.3%.	historical financials; 10-K excerpt 6; COO on the capex cycle

Topic	Structural facts	Current-period facts	KPI / numerical bank	Packet anchors
FCFF timing	Strategic investment can temporarily constrain free cash flow even if the operating story is constructive.	2025 guide says free cash flow remains temporarily constrained by strategic capital spending.	Historical building blocks: NOPLAT 45.0, Capex 45, D&A 28, NOWC 70 in 2024.	earnings release excerpts 1 and 4; 10-Q excerpts 4–5

3.4 Continuing-value fact bank

LLM prompt | Retrieve and organize a terminal-value fact bank

Using the same architecture scaffold, retrieve the packet evidence most relevant to **continuing value**. Organize the output into **durable economics**, **transitory effects to fade**, and **mature-industry constraints**. For each topic, list the retrieved facts, the relevant **KPI / numerical bank**, and the **packet anchors**. This is still a retrieval step: do not set a terminal growth rate, terminal RONIC, or valuation multiple.

Continuing-value topic	Retrieved facts	KPI / numerical bank	Packet anchors
Durable demand base	Equipment has a meaningful replacement-demand floor; the installed base supports Service and Controls revenue; education and healthcare emphasize uptime; service demand remained resilient even while Equipment normalized.	Replacement share; installed base; end-market mix.	10-K excerpt 2; 10-K excerpt 3; CEO on demand mix; 10-Q excerpt 3
Durable monetization quality	More than 60% of Service revenue is under contract; renewal remains above 90%; Controls attach has risen from 34% to 40%; retrofit demand extends monetization into the installed base.	Contract share; renewal; attach rate; segment margins.	10-K excerpts 3–4; historical table; Head of service on installed-base monetization
Transitory effects to fade	Backlog normalization affects the near-term Equipment run rate; under-absorption and launch costs weigh on the first forecast year; price-cost tailwinds are moderating; 2025 is the peak year of strategic capex.	Backlog 110 at 2024 year-end; peak 2025 capex language.	10-K risk factor; earnings release excerpts 3–4; CFO on price-cost; 10-Q excerpts 2 and 5
Mature-industry constraint	Mature HVAC growth is usually low to mid single digits unless a replacement or retrofit cycle is unusually strong; Service contracts and Controls usually carry better economics than hardware-only sales.	Industry description rather than a single KPI.	Industry snapshot

What the fact-bank stage accomplishes

At this point the packet has been reorganized by **topic** rather than by source. The analyst now has company-specific evidence on growth, margins, reinvestment, and continuing value, plus the relevant numerical anchors. That is the right moment to switch from retrieval to judgment.

4. Step 3 | Human + AI collaboration: from fact banks to forecast assumptions

Division of labor

The fact-bank stage is about **organization and retrieval**. The next stage is about **judgment**. The LLM can propose ranges, weighted builds, and explicit because-clauses. The analyst decides which evidence is structural, which is temporary, how quickly benefits should appear, and what the mature business should look like. A useful rhythm is: **direction** → **rank order** → **range** → **point estimate** → **falsifier**.

4.1 Growth mapping

LLM prompt | Translate the growth fact bank into assumptions

Using the growth fact bank and the historical numerical bank, translate the evidence into explicit 2025 growth assumptions. For each revenue branch, identify the key **structural fact carried forward**, the key **near-term fact carried forward**, a **supportable range**, and a **base-case point estimate**. Then compute company revenue growth as the weighted consequence of the segment assumptions rather than as an independent guess. Keep the reasoning transparent, segment-specific, and numerically checkable.

Forecast line	Structural fact carried forward	Near-term fact carried forward	Supportable range	Base-case mapping
Equipment Systems 2025 growth	About 65% of Equipment revenue is replacement-driven, so the segment has a floor under demand.	Backlog normalization and distributor inventory adjustment lower the 2025 run rate; Q1 Equipment grew only 2%.	3%–5%	**4.5%.** Positive, but below company growth. The point estimate respects replacement resilience without ignoring the normalization language and the soft Q1 print.
Service & Parts 2025 growth	Installed base, contract share above 60%, and renewal above 90% support recurring demand.	Management expects Service to outgrow Equipment in 2025; Q1 Service grew 7% and held up in education / healthcare.	7%–8.5%	**8.0%.** Steadier than Equipment, but still consistent with a mature service engine rather than software-like hypergrowth.
Controls Software 2025 growth	Attach rose from 34% to 40% and the installed base offers retrofit runway.	Management still frames Controls as the fastest-growing business; Q1 Controls grew 11%.	11%–13%	**12.0%.** The assumption gives credit to attach and retrofit momentum without assuming indefinite acceleration.

Forecast line	Structural fact carried forward	Near-term fact carried forward	Supportable range	Base-case mapping
Company 2025 growth	Company growth should be the weighted result of the segment build.	Management's guide of 5%–7% is a check on the build, not a substitute for it.	5%–6.5%	**6.0%.** Using the 2024 mix, 0.70×4.5% + 0.20×8.0% + 0.10×12.0% ≈ 6.0%.

Growth translation

The company growth number is not a separate opinion. It is the **weighted consequence** of the segment build. That is why the segment engine table and monetization map come before the growth forecast.

4.2 Margin mapping

LLM prompt | Translate the margin fact bank into assumptions

Using the margin fact bank and the historical numerical bank, translate the evidence into an explicit NOPLAT margin path. Explain why the first forecast year should improve only modestly, why later years can improve further, and how mix, automation timing, price-cost, and temporary launch / under-absorption effects shape that path. Keep the answer causal and base-case oriented.

Margin question	Evidence carried forward	Base-case mapping
Why 2025 improves only modestly	Mix and automation support a better margin profile, but 2025 guidance explicitly says that those benefits are partly offset by temporary under-absorption and launch costs. Q1 confirms the same pattern.	**2024A 9.0% → 2025E 9.2%.** The direction is positive, but the transition is not finished in the first forecast year.
Why margins can keep improving in 2026–2027	The Ohio automation program becomes more visible in late 2025 and 2026, while Service and Controls remain the larger source of incremental profit dollars.	**2026E 9.5%; 2027E 9.8%.** The path spreads the benefit over time instead of pulling it all into 2025.
Why mix is a real mechanism	Service and Controls carry much higher segment margins than Equipment; even a modest shift toward those engines improves consolidated economics before any dramatic Equipment recovery is assumed.	Using the simplified packet margins, a shift from a 70 / 20 / 10 mix to a 66 / 22 / 12 mix raises the directional weighted segment margin from **13.10%** to **13.72%**—about **+62 bps** before further execution gains.

4.3 Reinvestment, ROIC, and FCFF mapping

LLM prompt | Translate the reinvestment fact bank into assumptions

Using the reinvestment fact bank and the historical numerical bank, map packet evidence into explicit assumptions for capex, working-capital heaviness, invested-capital turnover, ROIC, and FCFF timing. Keep the causal chain visible: operating narrative → balance sheet → cash flow. The output should explain not only the direction of each line, but also why the timing is coherent.

Forecast line	Evidence carried forward	Base-case mapping
2025 capex	2025 is the peak year of strategic capex and the automation cash outflow is front-loaded relative to the operating payoff.	Keep capex elevated in 2025 and let it normalize afterward. In the final model, this shows up as heavier reinvestment and weaker near-term FCFF conversion.
2025 working capital	Inventory is staged for the heat-pump launch and automation commissioning; receivables rise with volume.	Working capital remains slightly heavy in 2025 and eases later as timing normalizes.
Invested-capital turnover	Revenue benefits lag the capital build, so the denominator improves before the numerator fully catches up.	**Turnover 1.59x in 2024A → 1.56x in 2025E → 1.60x in 2026E → 1.65x in 2027E.**
ROIC path	Margin improves first while turnover is still under pressure, then both help together as utilization catches up.	**ROIC 14.4% in 2025E, 15.2% in 2026E, and 16.2% in 2027E.**
FCFF timing	Strategic capex and somewhat heavy working capital absorb cash faster than NOPLAT improves in 2025.	FCFF remains muted in 2025 and recovers in 2026–2029 as capex normalizes and turnover improves.

Reinvestment translation

ApexCo is a good example of why **better operating prospects** and **muted near-term free cash flow** can coexist. The key is timing: capital is being deployed before it is fully harvested.

4.4 Continuing-value mapping

LLM prompt | Translate the terminal fact bank into terminal assumptions

Using the continuing-value fact bank, separate what should **survive into maturity** from what should **fade before terminal**. Then translate that distinction into a mature growth rate, a mature RONIC, and the implied cash-conversion logic. Keep the answer grounded in durable business economics rather than shortcut terminal heuristics.

Terminal input	What survives into maturity	What fades before terminal	Base-case mapping
Mature growth	Replacement demand, installed-base monetization, recurring Service contracts, rising Controls penetration, and retrofit demand.	Backlog normalization and the current transition-year growth pattern.	**Terminal growth = 3.0%.** Positive and healthy, but consistent with a mature industry rather than an early-period momentum phase.
Mature RONIC	Service and Controls remain better businesses than Equipment, so incremental returns can stay above the cost of capital.	Peak mix acceleration and transition-year distortions should not be frozen forever.	**Terminal RONIC = 12.5%.** Attractive, but below the explicit forecast period's peak improvement pace.
Mature cash conversion	Some reinvestment is still needed to support installed-base growth, service depth, and controls penetration.	Peak 2025 capex and temporary under-absorption roll off.	With $g = 3.0\%$ and terminal RONIC of 12.5%, the implied terminal reinvestment rate is **24.0%** and terminal FCFF / NOPLAT is **76.0%**.

The terminal question

The real terminal-value question is not "What number should go into the model?" It is **which parts of today's story survive into maturity**. ApexCo's continuing value is defensible only if the durable Service / Controls / installed-base economics are preserved while the transition-year effects clearly fade.

4.5 Pressure-testing the story

LLM prompt | Challenge the assumptions and propose sensitivity tests

Review the base-case forecast build as if you were preparing an investment committee memo. Identify the three highest-leverage falsifiers, explain what observable fact pattern would break the base case, and specify the model sensitivity that should be run in response. Focus on the assumptions that matter most for value, not on low-impact noise.

Falsifier	What would break the base case	Suggested sensitivity test
Distributor destocking lasts longer	Backlog normalization turns into a longer channel reset, and Equipment demand stays below the replacement floor implied by the base case.	Reduce 2025–2026 Equipment growth by 200 bps, slow the release of working capital, and delay turnover recovery by one year.
Controls attach stalls	Controls attach stays near 40% and retrofit demand softens, weakening the mix and durability story.	Cut Controls growth by 300 bps in 2026–2029 and lower terminal RONIC by 50–100 bps.
Automation underdelivers	The Ohio automation program arrives later or at a smaller productivity benefit than management suggests.	Reduce 2026–2027 NOPLAT margin by 50 bps, keep turnover flatter for longer, and lower FCFF in the mid-years.

5. Step 4 | Assemble the DCF forecast and continuing value

The forecast is a connected system

Segment growth drives **mix**. Mix supports **margin**. Reinvestment shapes **turnover**. Turnover and margin together determine **ROIC**. FCFF is then the cash-flow expression of that operating story. The goal of the final table is to show those links explicitly rather than treating each line as an isolated assumption.

Forecast item	2024A	2025E	2026E	2027E	2028E	2029E
Revenue	500.0	528.0	558.6	588.2	614.7	639.3
Revenue growth	—	5.6%	5.8%	5.3%	4.5%	4.0%
NOPLAT margin	9.0%	9.2%	9.5%	9.8%	9.7%	9.6%
NOPLAT	45.0	48.6	53.1	57.6	59.6	61.4
Invested-capital turnover	1.59x	1.56x	1.60x	1.65x	1.67x	1.68x
ROIC	14.3%	14.4%	15.2%	16.2%	16.2%	16.1%
Reinvestment rate / NOPLAT	—	39.0%	38.2%	32.8%	27.8%	24.8%
Reinvestment	—	19.0	20.3	18.9	16.6	15.2
FCFF	—	29.6	32.8	38.8	43.1	46.2

How the lines connect

This table is meant to be read vertically and horizontally. Vertically, it shows one year's revenue, margin, turnover, ROIC, reinvestment, and FCFF. Horizontally, it shows the business moving from a **transition year** in 2025 toward a more normalized profile by 2028–2029. The fade in growth, the normalization of reinvestment, and the maturing margin profile are what make the continuing value coherent.

5.1 Continuing value bridge

From terminal framing to continuing value

The continuing-value step turns the mature forecast into a next-year FCFF and then capitalizes that cash flow. Here the focus is forecasting, so the WACC below is purely **illustrative**. The key teaching point is the economic chain: mature growth requires reinvestment, and terminal RONIC tells the model how much reinvestment is needed to support that growth.

Continuing-value bridge item	Illustrative value
2029 revenue	639.3 (about 640)
2029 NOPLAT margin	9.6%
2029 NOPLAT	61.4
2030 mature growth g	3.0%
2030 mature RONIC	12.5%
Implied terminal reinvestment rate	$g/\text{RONIC} = 24.0\%$
2030 FCFF / NOPLAT	$1 - g/\text{RONIC} = 76.0\%$
2030 NOPLAT	63.2
2030 FCFF	48.0
Illustrative WACC[1]	9.0%
Continuing value at end of 2029	$\text{CV}_{2029} = 48.0/(9.0\% - 3.0\%) \approx 800.7$

Continuing-value interpretation

ApexCo's continuing value is the value of a **mature continuing business**, not the value of freezing peak conditions forever. The 3.0% growth rate preserves replacement, service, and controls durability. The 12.5% terminal RONIC keeps mature returns above the cost of capital. The 24.0% reinvestment rate and 76.0% FCFF / NOPLAT conversion complete the economic story.

6. Closing takeaways

A good LLM-assisted forecasting workflow for an unfamiliar company has four distinct moves:

1. **Extract the business architecture.** Identify the engines, the monetization map, the KPI ledger, the driver tree, and the historical numerical bank.
2. **Retrieve company-specific fact banks.** Use the architecture to pull evidence on growth, margins, reinvestment, and continuing value using the company's own vocabulary.
3. **Translate facts into assumptions.** Combine the model's organization with analyst judgment on structure versus temporary effects, range versus point estimate, and what deserves to survive into terminal value.
4. **Assemble one connected DCF.** Let segment growth drive mix, let mix influence margin, let reinvestment shape turnover, and let turnover and margin together determine ROIC, FCFF, and continuing value.

Bottom line

The strongest use of LLMs in a DCF workflow is not "forecasting by chatbot." It is **architecture extraction**, **evidence retrieval**, and **structured preparation for judgment**. ApexCo works well as a mini-case because the packet contains enough detail to show the entire chain: segment economics → KPIs → fact banks → forecast assumptions → ROIC, FCFF, and continuing value.

[1] WACC is outside the main scope of this handout. It is introduced here only to close the DCF loop with a numerical continuing value.

A. Appendix | Original packet excerpts by source

The body of this handout reorganizes the ApexCo packet by **workflow** and **forecast topic**. This appendix restores the original source order so that each fact bank, assumption, and forecast line can be traced back to the underlying synthetic disclosure set. The core historical tables already appear in the body of the handout; the appendix below focuses on the original narrative excerpts, grouped by data source rather than by driver.

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 2 | Demand structure

"Approximately 65% of Equipment Systems revenue is tied to replacement demand, with the balance linked to new construction and retrofit projects. Replacement activity tends to be less volatile than project-based demand and is supported by the age profile of the installed base."

10-K excerpt 3 | Installed base and service revenue

"Service & Parts revenue is supported by an installed base of approximately 95,000 active systems, with more than 60% of service revenue under recurring contract arrangements. Contract renewal rates have remained above 90% for the last three fiscal years."

10-K excerpt 4 | Controls attach and retrofit opportunity

"Controls software was attached to approximately 40% of new equipment placements in 2024, compared with 34% in 2022. The company also sees a sizable retrofit opportunity in the legacy installed base, particularly in education and healthcare facilities."

10-K excerpt 5 | Cost structure

"The company's largest cost pools include materials, manufacturing labor, freight, field service labor, and ongoing software development. Segment profitability is influenced by product mix, service contract penetration, pricing discipline, and utilization of automated capacity."

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 7 | Risk factor

"As global supply chains normalized, distributor ordering patterns became less influenced by safety-stock behavior. As a result, reported Equipment growth in 2025 could be affected by lower backlog conversion and distributor inventory normalization."

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 2 | Segment framing

"Service & Parts is expected to outgrow Equipment Systems in 2025, while Controls Software is expected to remain the fastest-growing business. Equipment Systems should continue to benefit from replacement demand, though backlog normalization will moderate the near-term growth rate."

Earnings release excerpt 3 | Margin framing

"Adjusted operating margin is expected to be flat to up modestly in 2025 as automation savings and service mix gains are partially offset by temporary under-absorption and launch costs associated with new capacity."

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."

A.3 Q4/FY2024 earnings call excerpts

CEO on demand mix

"We continue to see replacement demand hold up better than greenfield demand. That is especially true in healthcare and education, where uptime matters more than new square footage."

CFO on price-cost

"Price-cost remained positive in the fourth quarter, although the benefit was less pronounced than earlier in 2024. We still see room for productivity gains, but future margin improvement should come more from mix and automation than from pricing alone."

COO on the capex cycle

"The Ohio automation program will be most visible in the back half of 2025 and in 2026. The investment goes into the books before the full revenue and productivity benefit shows up in the income statement."

Head of service on installed-base monetization

"Service attachment improved again this year, and retrofit demand for controls was strongest where customers were trying to lower energy usage without replacing the full system."

CEO on medium-term economics

"As we move past the current investment cycle, we expect Equipment margins to improve through better automation and mix, while Service and Controls should remain the larger source of incremental profit dollars."

A.4 Q1 2025 10-Q excerpts

10-Q excerpt 1 | Segment performance

"First-quarter revenue increased 5% year over year. Equipment Systems revenue increased 2%, Service & Parts increased 7%, and Controls Software increased 11%. Consolidated gross margin improved modestly, though launch costs and temporary under-absorption partially offset mix benefits."

10-Q excerpt 2 | Backlog normalization

"Equipment backlog declined from year-end levels as lead times normalized and certain distributors reduced safety inventory. The decrease reflected timing and channel normalization rather than a broad-based decline in end-customer activity."

10-Q excerpt 3 | Service resilience

"Service & Parts demand remained resilient during the quarter, particularly in education and healthcare end markets, where maintenance activity and retrofit work remained stable."

10-Q excerpt 4 | Working capital

"Inventory increased modestly as the company staged components for the heat-pump launch and commissioned new automation cells. Accounts receivable increased in line with sequential volume improvement."

10-Q excerpt 5 | 2025 capex update

"Management continues to expect fiscal 2025 to be the peak year for strategic capital spending, with the majority of automation-related cash outflows occurring before year-end."

A.5 Industry snapshot

Condensed industry notes

- Nonresidential HVAC demand has both cyclical and replacement components. Replacement demand is typically steadier than new-project demand.
- Efficiency regulation, electrification, and heat-pump adoption can support upgrade cycles over time.
- Service contracts and building controls often produce better margins than hardware-only sales because they deepen customer relationships and raise switching costs.
- Mature industry growth is typically low to mid single digits unless a replacement or retrofit cycle is unusually strong.
- Key risks include distributor destocking, delayed construction starts, input-cost swings, and slower adoption of premium controls features.