Otis 90-Minute 3-Statement Model — Complete, Structured Notes (Full Coverage)

0) Orientation & Intent

- **Format:** Tutorial that builds a **full 3-statement model** from a **blank Excel sheet** in a **90-minute case study** format.
- **Output:** Start with a blank sheet → end with a finished model (author completed in ~75 minutes in his run-through).
- **Why this tutorial exists:**
    - People critique training that **starts from templates** (too easy: formatting and structure pre-built).
    - Value in **starting from scratch**, but **teaching it takes longer** (data entry + formatting are time-consuming/boring).
    - In real life, **you often start from templates** (on the job and in many case studies). Still worth learning scratch builds.
- **Tools used here:** A few **custom QAT shortcuts** + **simple macros** to save minutes (you must be **fast with Excel**; otherwise, slow/rewind).
- **Files & resources:** On mergersandinquisitions.com (3-statement model page) — blank/completed Excel, PDFs, links.

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1) What is a 3-Statement Modeling Test?

- **Task:** Take **historical IS/BS/CFS**, project **~5 years** (here: 2022–2026 for Otis).
- **Data source:** Otis **10-K** → **financial statements & supplementary data** (preferably Excel/CSV over PDF).
- **Purpose:** Judge if **growth/margins/FCF** are **realistic**; test **funding needs** and **downside scenarios** (e.g., market turns).
- **Case types:**
    1. **Blank sheet + strict time** (30–240 min): speed, shortcuts, simplification, quick decisions, don't overthink.
    2. **Template + strict time:** data already filled; your job is **assumptions & formulas**, then **answer questions based on outputs**.
    3. **No strict time (days/week):** do **outside research** to **justify assumptions**; often ends with a **presentation**.
- **This tutorial's plan:**

- Input historicals → Project **IS**, **BS**, **CFS** → **Link** statements → Handle **Debt & Buybacks** → **Checks & Review**.

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2) Part 1 — Inputting Historical Financial Statements

A) Case brief highlights (from prompt)

- Build **5-year projections**.
- Do **more than a simple % growth** for revenue.
- Assume a **minimum cash** balance.
- Use **company guidance** for **M&A, debt, dividends, buybacks**.
- **Don't over-format**; focus on delivering a working model.
- Be able to **evaluate management claims** with your model.

B) Universal setup tips

- **Always get company financials in Excel/CSV** (faster than PDF).
- **Swap columns** to **oldest → newest**.
- **IS signs: positive** for **revenue & income**, **negative** for everything else (easier checks).
- **Consolidate small line items** (you'll save projection time).

C) Excel workspace setup (practical moves)

- Remove **gridlines**: Alt W V G.
- Add a **skinny side column** (width 2) for navigation space.
- **Font size 12** across.
- **Dates:** Start at **FY2019**. Use EOMONTH to step 12 months; custom format via Ctrl+1 → Custom → "FY "YY".
- **Column order:** ensure oldest → newest (delete extra columns; unmerge anything that's merged).
- **Center headers:** uses Alt 5 (center).
- **Borders:** uses Alt 7 (top border) configured in QAT; otherwise Ctrl+1 → Border.

D) Income Statement (historicals)

- **Core structure for IS:**

    - Revenue: **Products**, **Services**, **Total revenue**.
    - **COGS**: Cost of products, Cost of services.
    - **Operating expenses** (combine **R&D + SG&A** — R&D too small to separate).
    - **Operating income**.
    - **Other income/expense**:
        - **Non-service pension expense** (treated like an interest-type item).
        - **Interest income/expense**.
        - (They had "Other income/expense" under OpEx; we **move it** to Other).
    - **Pre-tax income**.
    - **Income taxes** (**negative** sign for consistency).
    - **Net income**.
    - **Non-controlling interest (NCI) net income** (deduction).
    - **Net income to Parent**.
- **Key sign corrections:**
    - Company cells may have **positives** where you want **negatives** (taxes, NCI).
    - **Non-service pension** and **interest** needed **sign flips** to match reported **pre-tax** and **net income**.
- **Check against source:** Confirm **Net income matches** the 10-K Excel after fixing signs/placements.

E) Balance Sheet (historicals)

- **Modeling guideline:** Aim for **~5 items per side** (don't go >10 each — projections get unwieldy).
- **Assets (consolidate smartly):**
    - **Cash** (incl. **restricted cash**).
    - **Accounts receivable** (keep separate).
    - **Inventory & other** (consolidate **contract assets + inventory + other current assets**).

    - **Net PP&E + Goodwill + Intangibles** (combine because **D&A is not split** in cash flow; makes linking straightforward).
    - **Operating lease assets** (keep separate).
    - **Other assets** (combine **future income tax benefits + other assets**).
- **Liabilities & Equity:**
    - **Accounts payable**.
    - **Accrued liabilities**.
    - **Contract liabilities**.
    - **Total debt** (combine **short-term + long-term debt**).
    - **Operating lease liabilities** (match with lease assets).
    - **Other liabilities** (combine **pension & post-retirement**, **future income tax obligations**, **other long-term liabilities**).
    - Equity: **Common shareholders' equity** (roll all components), **Non-controlling interests** (**redeemable NCI** + **NCI**).
- **Ordering and mechanics:**
    - **Unmerge** cells everywhere.
    - Re-order columns as **2019–2021** (source only had 2020–2021, so 2019 might be blank in BS input; that's fine).
    - **Copy values/links** carefully; watch anchoring (F4) to avoid errors (fixed one on A/R).
- **Balance sheet check:** Confirm **Total assets = Total liabilities + equity** in historical years.

F) Cash Flow Statement (historicals)

- **Preparation:** Unmerge all, reorder year columns (ensure **C/D/E** lines up with **FY19/20/21**), add a **blank column** if needed for clean linking.
- **Build CFS (indirect):**
    - **CFO:** Start with **Net income to Parent** (because NCI is deducted on IS), then **reverse NCI net income** (add back); add **D&A**; aggregate **other operating** items (deferred tax, SBC, gains/losses, pension contributions, "other operating activities"); then a single line for **± change in working capital & leases** (combine all WC sub-lines).

    - **CFI: CapEx** separate; **everything else** under **"Acquisitions & other"** (consolidate all investing miscellany).
    - **CFF: ± Change in debt** (combine all issuances & repayments); **Common dividends**; **Stock repurchases**; **Dividends to NCI**; **Other items** (e.g., **debt issuance costs**, **net transfers**, etc.).
    - **FX effect on cash**: carry as a separate line.
    - **Net change in cash** = CFO + CFI + CFF + FX.
- **"Dash" issue:** Excel often treats **"–"** as text → **VALUE!** errors. **Replace dashes with 0** across problem cells (dividends, buybacks, "net transfers", etc.).
- **Reconcile:** Confirm **net change in cash** matches the source each year.

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3) Part 2 — Income Statement Projections

A) Revenue: must be driver-based, not a flat %

- **Strategy:** Split **New Equipment** vs **Service**.
- **Data fishing path:**
    - **10-K** is slow for unit details; **Investor Presentation** is faster.
    - Found: **Service units** (installed base) trend; **market share** chart for new equipment.
- **New Equipment approach:**
    - Use **Market size × Company market share**.
    - From chart: **market share ≈ 16% (2019)**, **~17% (2020)**, **18% (2021)**.
    - **Market growth** assumption: **LSD** (company says "up to low-single digits"). Use a taper like **5%, 5%, 4%, 3%**.
    - **Market share** glide: **18.0%, 18.2%, 18.4%, 18.5%, 18.5%** (gradual lift consistent with chart showing recovery since ~2012).
    - **Product revenue** = **Market size × Share** (using historical revenue/market share to back out base market size).
- **Service approach:**
    - Use **Service units × Revenue per serviced unit**.
    - **Units (mm)**: **2.00 (2019)**, **2.10 (2020)**, **~2.15 (2021)**; grow **3%** p.a. to ~2026 (from deck).

    - **Revenue per unit: Service revenue / units** (both in millions; direct division). Grow **~4%, 3.5%, 3.5%, 3%, 3%**.
    - **Service revenue** = **Units × Rev/unit**.
    - **Check vs guidance:** Service revenue **reaches ~$10bn by 2026** — model hits slightly earlier, but acceptable.
- **Totals:** Sum product + service. **Growth** sits ~**4%–7%** (a bit high but within LSD/MSD messaging; not split into "organic vs M&A").

B) Cost & Taxes (projection mechanics)

- **COGS (product)** as **% of product revenue**; **COGS (service)** as **% of service revenue**.
- **OpEx** as **% of total revenue**.
- **Tax rate** = **Taxes / Pre-tax income** (use historical **simple average**).
- **NCI net income** = **% of consolidated net income** (again **simple average**).
- **Other tiny lines** (**non-service pension expense**, **other income/expense**) → keep **flat** (too small to model).

Important technique: take **simple averages** for stable %s; **lock** that average and **link forward** (don't re-average each new year).

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4) Part 3 — Balance Sheet Projections (Working Capital focus)

A) Philosophy

- WC items can be **simple % of revenue/COGS/OpEx/total expenses**; goal is **directional correctness** of **ΔWC** sign/magnitude, not perfection.
- For Otis, **ΔWC tends to be positive** (cash inflow) historically (some exceptions).

B) What to project here vs. elsewhere

- **Project here: A/R**, **Inventory & other**, **Operating lease assets**, **A/P**, **Accrued liabilities**, **Contract liabilities**, **Other liabilities**.
- **Flow from CFS later: Cash**, **PP&E/Goodwill/Intangibles (combined)**, **Other assets**.
- **Debt** from **CFS**; **Operating lease liabilities** tied to **lease assets** movement; **NCI & common equity** via CFS links.

C) Create ratios (using FY20–21 where needed)

- **A/R** = **% of revenue**.
- **Inventory & other** = **% of COGS**.
- **Operating lease assets** = **% of OpEx**.
- **A/P** = **% of COGS**.
- **Accrued liabilities** = **% of total expenses** (= COGS + OpEx + small "other" if applicable).
- **Contract liabilities** = **% of total expenses**.
- **Other liabilities** = **% of total expenses**.

Only **two years** of data for some items → **use simple averages** and carry forward.

D) Compute projected balances

- Multiply forecast drivers by the **average %s** from history (careful with anchoring ranges).
- **Operating lease liabilities** shortcut: **Prior balance + Δ(lease assets)** (US GAAP simplification; IFRS is hairier).

E) Derive ΔWC & leases (to sanity-check magnitudes)

- **Asset side Δ** = **old − new** (asset ↑ consumes cash).
- **Liability side Δ** = **new − old** (liability ↑ provides cash).
- Sum to get **ΔWC & leases**; results here look **reasonable** (a bit high in the first year, but not extreme).

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5) Part 4 — Cash Flow Statement Projections (drivers & links)

A) Driver block to set up

- **CapEx** as **% of revenue** (simple average).
- **D&A** as **% of revenue** (simple average).
- **Pension & other** as **% of revenue** (small; simple average).
- **Acquisitions & other**: use **company guidance** → **$50–100mm** per year; assume **−$75mm** annually (middle of range).
- **Dividends (common)** = **% of Net income to Parent** → guidance **35%–40%** payout (use 35% → 37.5% → 40%).
- **Dividends to NCI** = **% of NCI net income** (≈ **100%** historically).

- **FX effects** = **% of revenue** (tiny; simple average).
- **Change in debt** and **Stock repurchases**: **defer** (need min cash + excess cash logic).
- **Other items (CFF)**: driven later off **debt issuance costs** (% of gross issuances).

B) Populate CFS forward

- **CFO:** NI to Parent → + reverse NCI NI → + D&A (% Rev) → + Pension/Other (% Rev) → + ΔWC & leases (from BS).
- **CFI:** CapEx (% Rev); Acquisitions & other (−$75mm).
- **CFF:** leave **Change in debt** & **Buybacks** blank for now; calculate **Dividends (common)** and **NCI dividends** from %s; **Other items** left for debt issuance fees.
- **FX**: revenue × tiny % average.
- **Net change in cash** formulas copied forward.

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6) Part 5 — Linking the Statements (project years)

A) Assets linked from CFS

- **Cash** = **Prior Cash + Net change in cash** (from CFS).
- **PP&E + Goodwill + Intangibles (combined)** = **Prior balance − CapEx − D&A** (note: subtract **positive** D&A; subtract CapEx).
- **Other assets** = **Prior − (Pension & other + Acquisitions & other)** (catch-all place for small assets tied to operating & investing lines).

B) Liabilities & Equity

- **Total debt** = **Prior + Change in debt** (from CFF).
- **Operating lease liabilities** = **Prior + Δ(lease assets)** (mirrors asset change).
- **NCI** = **Prior + NCI net income + NCI dividends** (remember NCI dividends appear **negative** on CFS, but the BS roll-forward uses the sign intact).
- **Common shareholders' equity** = **Prior + NI to Parent + Dividends + Stock repurchases + Other items + FX**
    - This is the **catch-all** for CFS items **not** explicitly linked to another BS line.

C) Balance check

- After linking for the first projection year, **BS balances**; copy across to all years and re-check.

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7) Part 6 — Debt & Stock Repurchases (policy logic)

A) Policy choices (define constants vs variables)

- **Given:** Company specifies **dividend payout** (35–40%). History shows **excess cash** is common.
- **Unknown splits:** How much of **excess cash** (after dividends, etc.) goes to **debt repayment** vs **buybacks** vs **targeted M&A**.
- **Minimum cash** (from case prompt): **$3.0bn** (units in model are **$mm** → enter **3,000**).

B) Excess cash computation

- **Excess cash** = **Prior year cash** + (CFO + CFI + CFF items **excluding** Change in debt, Buybacks, and "Other") + **FX** − **Minimum cash**.
    - Purpose: isolate cash available to allocate **without creating circular references** (don't include the unknowns while calculating).

C) Allocation rule

- If **Excess cash < 0** → issue **new debt == absolute shortfall** (i.e., **Change in debt > 0**).
- Else (**Excess cash ≥ 0**):
    - **Debt repayment** = **15%** of Excess cash (assumed; you could also use **20%/80%** or **15%/85%**).
    - **Stock repurchases** = **85%** of Excess cash (assumed).
- **Copy across years**.

D) "Other items" (debt issuance costs)

- Drive **Other items (CFF)** as **% of gross debt issuances** (when **Change in debt > 0**).
- Historical calc suggested **~3%**; use **2%** going forward. Implement as MAX(Change in debt, 0) × 2%.

E) Drop into CFS

- **Change in debt**: link from allocation block.

- **Stock repurchases**: link from allocation block.
- **Other items**: formula above (only when issuing).
- **Re-check BS balances** — still balanced.

F) Interest expense (final missing piece)

- Compute an **effective interest rate** historically: **Interest expense / same-year total debt ≈ ~2%**.
- Given era of **rising rates**, but **Otis' maturities** are **far-dated** (2027, 2030, 2031, 2040, etc.), so the **blended rate rises only modestly**.
- **Assumption path: 2.5% → 3.0% → 3.0% → 3.5%** by the end of projection.
- **Modeling trick:** Calculate **interest expense** on **prior-year debt** (or average) to **avoid circularity**.
- Plug back into IS → recompute **Pre-tax**, **Taxes**, **Net income** → statements remain linked.

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8) Part 7 — Model Checks, Review & Final Comments

A) Limitations (what's "missing" by design for 90 minutes)

- Not built to **support many cases** cleanly (no scenario grid, sensitivities, etc.).
- **Not unit-level** for New Equipment (ideally tie **CapEx** to **productive capacity**; separate **units vs ASPs**; link **Service units** to **New Equipment sales** with **renewal rates**).
- **Taxes**, **COGS**, **OpEx** modeled in **simple averages**, not detailed cost drivers.
- **No margin optimization** overlays (mgmt talks about margin improvement; model leaves margins mostly stable).
- **Growth** a bit on the **high side** (since Acquisitions are embedded in growth instead of separated into "organic vs inorganic").

B) Commitments tested against guidance

- **Cumulative FCF (2022–2024):** Define FCF as **CFO − CapEx** (or **CFO − CFI** altogether). Model shows **~$5.2bn** vs mgmt **$5bn** goal → **plausible**.
- **Dividends:** ~**$1.4bn** over the period — roughly **one-third of $5bn FCF**; consistent with **35–40% payout**.

- **FCF conversion:** (CFO − CFI)/Net income **> 100%** across periods (historically ~110–133%), consistent with slides.

C) Speed tips reiterated

- Format later; **enter once, copy many**.
- Keep **WC ratios static**.
- Use **one debt block** to control CFF.
- Do **CFS last** (after IS/BS).
- Quick sanity bands: **NI margin ~10–11%**; **FCF conversion > 90%**; **Cumulative FCF ≈ mgmt claim**.

D) Final takeaway

- Under **extreme time pressure**, aim for **speed + plausibility** rather than full realism.
- Be comfortable with **shortcuts**, **imperfect data**, and **sign conventions**.
- The model as built **balances**, **links**, and **tests management claims** credibly within **90 minutes**.

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9) Micro-Details & One-liners (don't miss these)

- **Excel date trick:** EOMONTH(start_date, 12) to step fiscal years.
- **Custom FY format:** Ctrl+1 → Custom → FY YY.
- **Unmerge everything** in company exports before linking.
- **Reorder columns** to **oldest → newest** across all tabs.
- **IS sign discipline: revenue/income positive**, **expenses negative**; flip signs from source when needed (taxes, NCI, pension, interest).
- **Check pre-tax** when NI doesn't match (helps find misplaced/incorrectly-signed "other income/expense").
- **Combine tiny IS lines** (R&D into SG&A).
- **BS consolidation logic:** Combine **PP&E + GW + intangibles** when **D&A** not split — simplifies CFS links.
- **Lease modeling (US GAAP shortcut): Lease liabilities move with lease assets**.

- **ΔWC sign convention:** Assets **old − new**, Liabilities **new − old**.
- **CFO start: NI to Parent**, then **reverse NCI NI**.
- **Fix VALUE!** from **"–" → 0**.
- **Acquisitions & other (CFI):** set **−$75mm** p.a. (midpoint of $50–100mm guidance).
- **Dividends to NCI:** ~**100% payout** of NCI NI.
- **Dividends (common): 35% → 37.5% → 40%** payout progression.
- **Min cash: $3,000mm**.
- **Excess cash branching:** If negative → **issue debt**; if positive → **15% repay**, **85% buyback**.
- **Debt issuance costs ("Other items"): 2% of gross issuances only** (use MAX(Change in debt, 0) guard).
- **Interest rate path: 2.5% → 3.0% → 3.0% → 3.5%**; compute on **prior-year debt** to avoid circulars.
- **Balance sheet catch-all: Common equity** absorbs CFS items not otherwise mapped (e.g., buybacks, FX, Other).
- **Final checks: BS balances** every year; **cumulative FCF ≈ $5bn**; **service revenue ~ $10bn by 2026**.

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10) Ultra-Condensed Build Checklist (90-minute flow)

1. **Setup:** Gridlines off, FY dates, font 12, narrow column at left.
2. **IS historicals:** Enter & consolidate; fix signs; match NI.
3. **BS historicals:** Consolidate assets/liabs; match totals.
4. **CFS historicals:** Indirect method; replace dashes; match net change in cash.
5. **Revenue drivers:**
    - New Equipment = Market size × Share (16%/17%/18% base; 5/5/4/3% market growth; share glide to ~18.5%).
    - Service = Units (2.00/2.10/2.15mm, +3% p.a.) × Rev/unit (grow 4→3%).
6. **Margins & taxes:** Use simple averages for product/service COGS%, OpEx%, tax%, NCI%.

7. **WC ratios:** A/R (% Rev), Inventory/Other (% COGS), Lease assets (% OpEx), A/P (% COGS), Accrued/Contract/Other liabs (% total expenses); simple averages.
8. **CFS drivers:** CapEx% Rev, D&A% Rev, Pension/Other% Rev (averages); **Acq = −$75mm**; **Dividends = 35→40%**; **NCI div ~100% NCI NI**; **FX tiny% Rev**.
9. **Link statements:** Cash (prior + Δ), PP&E+GW+Intangibles (−CapEx − D&A), Other assets (−Pension − Acq), Debt (prior + ΔDebt), Leases (mirror assets), NCI (prior + NI + Div), Equity (catch-all).
10. **Min cash & allocation:** Min cash = $3.0bn; compute **Excess cash**; if <0 issue debt; else **15% repay / 85% buyback**; issuance costs 2% of **issuances only**.
11. **Interest expense:** prior-year debt × modest rising rate path.
12. **Sanity tests:** FCF ≈ mgmt claim, service to ~$10bn by 2026, BS balances.