# THE SKYSCRAPER - SOURCE Companion

*Ketineni Ramarao*

Every source cited in the manuscript, with an honest statement of how it was read and what it was used for. Read levels: full read (entire document), substantial read (majority of the document, all cited passages verified in context), partial read (cited sections read in context; the rest skimmed or unread), lead/infobox only (opening summary and data box only), excerpt level (search-result excerpts only, named as such in the entry). Vendor and advocacy sources are named as such and used only for their own facts. Where sources conflict, the conflict and the resolution are recorded in the manuscript's text.

- **SK1** - skyscrapercenter.com/criteria - full read 2026-11-01 (definitions, classes, 3 heights, statuses, floor-count caveats; "173 supertalls, 3 megatalls as of today" = read date). CAVEAT: that "as of today" count is a static, undated figure on the criteria page and is stale - the Council's own dated 2024 year-in-review gives 258 supertalls (SK51) and its live tallest-100 list shows 4 megatalls (SK26). The manuscript uses only the dated counts. Cited in: Chapter 1, Chapter 3, Chapter 22, Chapter 25. https://www.skyscrapercenter.com/criteria
- **SK3** - en.wikipedia Home_Insurance_Building (2026-10-22) - full read (incl. contested-first debate). Cited in: Chapter 1, Chapter 3, Chapter 5, Chapter 27. https://en.wikipedia.org/wiki/Home_Insurance_Building
- **SK4** - otis.com history timeline - full read (vendor source: company milestones only). Cited in: Chapter 2, Chapter 3, Chapter 4, Chapter 11, Chapter 18, Chapter 25, Chapter 30. https://www.otis.com/en/us/our-company/history
- **SK5** - en.wikipedia Monadnock_Building (2026-10-06) - full read. Cited in: Chapter 1, Chapter 3, Chapter 5, Chapter 6, Chapter 7, Chapter 8, Chapter 12, Chapter 27. https://en.wikipedia.org/wiki/Monadnock_Building
- **SK6** - khan.princeton.edu Sears Tower - full read (student-built course site w/ scholarly refs). Cited in: Chapter 9, Chapter 10, Chapter 19. http://khan.princeton.edu/khanSears.html
- **SK7** - khan.princeton.edu Hancock Center - full read. Cited in: Chapter 2, Chapter 9, Chapter 12, Chapter 18, Chapter 19, Chapter 25. http://khan.princeton.edu/khanHancock.html
- **SK8** - burjkhalifa.ae structure - full read (vendor: own features/records only). Cited in: Chapter 9, Chapter 10, Chapter 11, Chapter 12, Chapter 25. https://www.burjkhalifa.ae/the-tower/structures/
- **SK9** - som.com Burj Khalifa project page - partial. Cited in: Chapter 9, Chapter 10, Chapter 25. https://www.som.com/projects/burj-khalifa/
- **SK10** - archives.nyc "Race to the Top" (2024-10-25) - full read (NOTE: has loose figures - "Woolworth 692ft" typo vs 792 standard; ESB "1,300ft" as-announced). Cited in: Chapter 1, Chapter 2, Chapter 15.

https://www.archives.nyc/blog/2024/10/25/race-to-the-top

- **SK11** - en.wikipedia Woolworth_Building - lead+infobox+architecture intro. Cited in: Chapter 2, Chapter 7, Chapter 8, Chapter 11, Chapter 15, Chapter 27. https://en.wikipedia.org/wiki/Woolworth_Building
- **SK12** - en.wikipedia Fazlur_Rahman_Khan (2026-08-08) - most read (bio+tube systems+legacy). Cited in: Chapter 2, Chapter 9, Chapter 10, Chapter 30. https://en.wikipedia.org/wiki/Fazlur_Rahman_Khan
- **SK13** - en.wikipedia Lever_House (2026-09-06) - substantial read. Cited in: Chapter 2, Chapter 13, Chapter 14, Chapter 17, Chapter 27. https://en.wikipedia.org/wiki/Lever_House
- **SK14** - en.wikipedia Construction_of_the_World_Trade_Center - substantial read. Cited in: Chapter 2, Chapter 4, Chapter 11, Chapter 18, Chapter 28, Chapter 29. https://en.wikipedia.org/wiki/Construction_of_the_World_Trade_Center
- **SK15** - argaam.com Jeddah restart (2025-01-20) - full read (company announcement via X; SAR 7.2bn/42mo). Cited in: Chapter 25. https://www.argaam.com/en/article/articledetail/id/1783678
- **SK16** - en.wikipedia History_of_the_world's_tallest_buildings - substantial read. Cited in: Chapter 3. https://en.wikipedia.org/wiki/History_of_the_world%27s_tallest_buildings
- **SK17** - en.wikipedia Early_skyscrapers (2026-10-19) - substantial read. Cited in: Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7, Chapter 8, Chapter 12, Chapter 14, Chapter 28. https://en.wikipedia.org/wiki/Early_skyscrapers
- **SK18** - en.wikipedia Equitable_Life_Building_(Manhattan) - infobox+lead. Cited in: Chapter 4. https://en.wikipedia.org/wiki/Equitable_Life_Building_(Manhattan)
- **SK19** - en.wikipedia Flatiron_Building - infobox. Cited in: Chapter 7. https://en.wikipedia.org/wiki/Flatiron_Building
- **SK20** - en.wikipedia Equitable_Building_(Manhattan) (2026-10-01) - substantial read. Cited in: Chapter 2, Chapter 7, Chapter 14, Chapter 16. https://en.wikipedia.org/wiki/Equitable_Building_(Manhattan)
- **SK21** - en.wikipedia 40_Wall_Street - infobox+lead. Cited in: Chapter 15. https://en.wikipedia.org/wiki/40_Wall_Street
- **SK22** - en.wikipedia Reliance_Building - infobox+lead. Cited in: Chapter 6, Chapter 12, Chapter 27. https://en.wikipedia.org/wiki/Reliance_Building
- **SK23** - en.wikipedia Singer_Building - infobox. Cited in: Chapter 7, Chapter 8, Chapter 27. https://en.wikipedia.org/wiki/Singer_Building
- **SK24** - en.wikipedia Metropolitan_Life_Insurance_Company_Tower - infobox. Cited in: Chapter 7. https://en.wikipedia.org/wiki/Metropolitan_Life_Insurance_Company_Tower
- **SK25** - CTBUH->CVU rename, GlobeNewswire release 2025-10-06 + verticalurbanism.org brand page - search-result/excerpt level. Cited in: Chapter 1. https://www.streetinsider.com/Globe+Newswire/Council+on+Tall+Buildings+and+Urban+Habitat+Announces+New+Name%3A+Council+on+Vertical+Urbanism/25423738.html (GlobeNewswire release text); brand page https://verticalurbanism.org/
- **SK26** - skyscrapercenter.com tallest100-completed - read 2026-11-01, ranks 1-48 read (dated list anchor). Cited in: Chapter 1, Chapter 23, Chapter 24, Chapter 25. https://www.skyscrapercenter.com/buildings?list=tallest100-completed
- **SK27** - en.wikipedia Curtain_wall_(architecture) (2026-04-24) - substantial read. Cited in: Chapter 6, Chapter 13. https://en.wikipedia.org/wiki/Curtain_wall_(architecture)
- **SK28** - en.wikipedia Empire_State_Building - substantial read (incl. 42/33/26 psf stiffness comparison, dates, $40,948,900 cost, broadcasting history). NOTE: the page's 42/33/26 psf figures are a structural-stiffness comparison, not steel weight per floor area - Ch10 now uses Khan's steel figures (SK12/SK6) and names the difference; the page also records the official five construction deaths (contractors' 1930 announcement; press rumors of 14, New Masses 42) now cited in Ch30. Cited in: Chapter 9, Chapter 10, Chapter 15, Chapter 16, Chapter 19, Chapter 30. https://en.wikipedia.org/wiki/Empire_State_Building
- **SK29** - en.wikipedia Chrysler_Building - substantial read (vertex secretly raised in 90 min, 1,046 ft, passed 40 Wall + Eiffel). Cited in: Chapter 15. https://en.wikipedia.org/wiki/Chrysler_Building
- **SK30** - en.wikipedia Seagram_Building (2026-09-29) - infobox+lead+history partial (Mies/Johnson, Lambert, 1958, bronze/Muntz, plaza -> 1961 zoning influence). Cited in: Chapter 13, Chapter 17, Chapter 27. https://en.wikipedia.org/wiki/Seagram_Building
- **SK31** - en.wikipedia Rockefeller_Center (2026-10-21) - lead+history partial (Columbia lease 1928, Met Opera origin, 1931/1933, Associated Architects/Hood, RCA slab). Cited in: Chapter 16. https://en.wikipedia.org/wiki/Rockefeller_Center
- **SK32** - en.wikipedia Willis_Tower (2026-10-07) - infobox+elevators/foundations partial (103 elevators, 14 double-deck, sky lobbies, 201 caissons/114 to limestone). Cited in: Chapter 11, Chapter 12, Chapter 19, Chapter 22, Chapter 23. https://en.wikipedia.org/wiki/Willis_Tower

- **SK33** - en.wikipedia Shanghai_Tower - substantial read (632m, 120-deg twist cuts wind 24%/steel 25%, Shanghai Eye TMD, 20.5 m/s elevators to 2017, double skin). Cited in: Chapter 10, Chapter 11, Chapter 13, Chapter 24. https://en.wikipedia.org/wiki/Shanghai_Tower
- **SK34** - en.wikipedia Petronas_Towers - infobox+foundations partial (104 piles 60-114m, raft 13,200 m3/54h, concrete choice). Cited in: Chapter 12, Chapter 22. https://en.wikipedia.org/wiki/Petronas_Towers
- **SK35** - en.wikipedia Taipei_101 - infobox+structure partial (660t TMD, fault 200m, 380 piles 80m, outriggers 8-floor intervals, spire dampers, 95mm facade drift). NOTE: this page gives the damper floors as 88F-92F; the official taipei-101.com.tw damper page (SK61) gives 87F-92F, which the manuscript follows. Cited in: Chapter 10, Chapter 12, Chapter 23. https://en.wikipedia.org/wiki/Taipei_101
- **SK36** - theguardian.com HSBC HQ history (2015-05-28) - full read (Foster, most expensive building 1986, suspension trusses, prefab kit, sunscoop, feng shui cannons). Cited in: Chapter 20. https://www.theguardian.com/cities/2015/may/28/hong-kong-hsbc-hq-bank-history-cities-50-buildings
- **SK37** - cnn.com Bank of China Tower (2017-12-21) - full read (Pei, 1990, first non-US >1000ft, bamboo shoot, feng shui X-to-diamond redesign). Cited in: Chapter 20. https://www.cnn.com/style/article/100-years-of-i-m-pei-bank-of-china
- **SK38** - old.skyscraper.org Vertical Cities HK walkthrough - full read (Mid-levels density, 18x lot ratio, HSBC 47st 1985, BoC 72st 1990, feng shui siting). Cited in: Chapter 20. https://old.skyscraper.org/EXHIBITIONS/VERTICAL_CITIES/walkthrough_central.php
- **SK39** - en.wikipedia 432_Park_Avenue - substantial read (Viñoly, Macklowe, 1,396ft, 15:1, windbreaks, FAR exemption, facade cracking). Cited in: Chapter 21. https://en.wikipedia.org/wiki/432_Park_Avenue
- **SK40** - China supertall restrictions: english.www.gov.cn Xinhua report (2021-07-08) - full read (NDRC ban >500m, restrict >250m, seismic review >100m) + gov.cn MOHURD notice 76/2021 (2021-10-22) - search-result full-clause excerpt (150m/250m tiers by city population, lifetime accountability) + reuters.com (2021-10-27) - excerpt via search (paywalled body) + SCMP (2021) - excerpt via search (SEG Plaza wobble context). Cited in: Chapter 24. http://english.www.gov.cn/statecouncil/ministries/202107/08/content_WS60e6aa97c6d0df57f98dc9a3.html
- **SK41** - en.wikipedia Air_rights (2026-10-17) - full read (ad coelum doctrine, FAA navigable airspace, TDR concept). Cited in: Chapter 26, Chapter 27. https://en.wikipedia.org/wiki/Air_rights
- **SK42** - buildingtheskyline.org “Economics of Skyscraper Height IV” (2019-06-04, Jason Barr) - full read (avg top-100 height 285m 2000 -> 385m 2018; demand vs cost-side; “machine that converts air to land”). Cited in: Chapter 26. https://buildingtheskyline.org/skyscraper-height-iv/
- **SK43** - blogs.lse.ac.uk Ahlfeldt/Barr synthesis summary (2020-07-28) - full read (tallest-per-year 1.3%/yr trend 1900-2019 vs GDP 3.2%; 1913 Heights of Buildings Commission quote). Cited in: Chapter 26. https://blogs.lse.ac.uk/businessreview/2020/07/28/do-skyscrapers-make-economic-sense/
- **SK44** - en.wikipedia Skyscraper_Index (2026-05-15) - substantial read (Lawrence 1999, eve-of-downturn correlation, counter-study: GDP predicts height not vice versa). Cited in: Chapter 26. https://en.wikipedia.org/wiki/Skyscraper_Index
- **SK45** - credaily.com Manhattan office (2025-09-24) - full read (availability 14.7% lowest since 2021, trophy vs Class B split, 15M+ SF conversions removed, 21.1M SF H1 2025 leasing). Cited in: Chapter 26. https://www.credaily.com/briefs/office-availability-declines-in-manhattan-as-trophy-leasing-surges/
- **SK46** - agbi.com Jeddah Tower (2026-10-05) - FULL READ by writer 2026-11-01 (Toscano at Saudi Mega Projects 2026: completion “late 2028”; 116 floors/~466m reached Sept 2026; 41 of 157 floors remain; restart Jan 2025 at 63 floors; ~5 days/floor core; “a kilometre plus”; apartments on sale 2027; Cityscape Riyadh Nov 2026 masterplan showing is FUTURE as of Nov 1 - kept as projection. CAVEAT: single trade-press interview). Cited in: Chapter 25, Chapter 32. https://www.agbi.com/real-estate/2026/10/jeddah-tower-construction-to-complete-in-late-2028/
- **SK47** - cnbc.com office net reduction (2025-06-02, exclusive CBRE data) - FULL READ by writer 2026-11-01 (2025 first year in 25+ where removals 23.3msf demolition+conversion > completions 12.7msf, largest 58 US markets; national office vacancy ~19% record; 85msf conversion pipeline; 33,000 units since 2016). Cited in: Chapter 26. https://www.cnbc.com/2025/06/02/office-space-net-reduction.html
- **SK48** - en.wikipedia New_York_City_Landmarks_Preservation_Commission (2026-10-02) - substantial read (Penn Station destruction -> LPC 1962 + Landmarks Law Apr 1965; 37,800+ properties as of 2020). Cited in: Chapter 27. https://en.wikipedia.org/wiki/New_York_City_Landmarks_Preservation_Commission
- **SK49** - en.wikipedia One_Meridian_Plaza (2026-09-18) - substantial read (Feb 23 1991 fire, 19 hrs, 3 FF deaths, standpipe pressure failure, stopped at sprinkled 30th floor, demolished 1999). Cited in: Chapter 28. https://en.wikipedia.org/wiki/One_Meridian_Plaza

- **SK51** - skyscrapercenter.com/year-in-review/2024 - FULL READ by writer 2026-11-01 (138 completions 200m+ in 2024, -25% vs 184 in 2023; 97 of 138 in China; cumulative 2,596 x 200m+ / 258 supertalls thru 2024; China 1,271; 210 cities/41 countries; avg completion 231.5m; world-100 avg 410.7m; record 115 on-hold, 88 China; Jeddah “restarted late 2024”, ~1/3 complete, 1,000m listed - discrepancy vs SK46 kept attributed; 2025 numbers are projections). Cited in: Chapter 1, Chapter 24, Chapter 25. https://www.skyscrapercenter.com/year-in-review/2024
- **SK52** - edgeprop.my Merdeka 118 (2025-08-27) - FULL READ by writer 2026-11-01 (PMVSB CEO: ~70% of office space leased, tenants incl Bank of America; Maybank Mid Zone floors 42-73; Park Hyatt KL in tower). Cited in: Chapter 25. https://www.edgeprop.my/content/1913607/70-merdeka-118%E2%80%99s-offices-leased-out-full-development-slated-5-6-years
- **SK53** - cushmanwakefield.com conversions report release (2025-10-07) - FULL READ by writer 2026-11-01 (brokerage): NYC conversion starts 1.6msf 2023 / 3.3msf 2024 / 4.1msf thru Aug 2025; 8.8msf proposed post-2025; Manhattan vacancy 22.3% Aug 2025 vs 9.4% pre-pandemic 5yr quarterly avg; policy: Accelerator 2023, 467-m 2024, City of Yes, 2025 FAR-cap lift. Cited in: Chapter 26. https://www.cushmanwakefield.com/en/united-states/news/2025/10/office-to-residential-conversions-surge-to-record-levels-in-new-york-city
- **SK54** - rentcafe.com adaptive reuse (2025-02-10) - FULL READ by writer 2026-11-01: pipeline 23,100/45,200/55,300/70,700 units 2022-2025; of 55,339 in development Jan 2024 only 3,709 completed by Dec; NY metro 8,310 units; 1.2bn sqft (14.8% of office inventory) rated convertible (CommercialEdge). Cited in: Chapter 26. https://www.rentcafe.com/blog/rental-market/market-snapshots/adaptive-reuse-office-to-apartments-2025/
- **SK55** - Ahlfeldt & McMillen, “Tall Buildings and Land Values,” REStat 2018 (Chicago 1870-2010) - SUBSTANTIAL READ by writer 2026-11-01 (open PDF, all cited passages verified): per-floor cost of 50-floor building ~3x a 10-floor, costs rising exponentially; cost elasticity ~25% small buildings to “well above unity” supertall; land-price elasticity of height 45% commercial/30% residential in 2000, approximately doubled over 100 years; Burj $1.5bn (Long 2011); One WTC $3.8bn (Brown 2012). Cited in: Chapter 26, Chapter 32. https://researchonline.lse.ac.uk/id/eprint/84873/1/GA_DMcM_Tall_buildings_merge.pdf ; DOI https://doi.org/10.1162/rest_a_00734
- **SK56** - Barr, Mizrach & Mundra, “Skyscraper Height and the Business Cycle,” Applied Economics 47(2) 2015 - FULL READ by writer 2026-11-01 (working-paper PDF): “very little correlation” between record-building announcement/completion dates and the business cycle; height and output cointegrated; height does not Granger-cause output (US, Canada, China, Hong Kong). Cited in: Chapter 26. https://kmundra.newark.rutgers.edu/files/2014/10/bmm_skyscraper_appliedeconfinal22sept14.pdf
- **SK57** - Thornton, “Skyscrapers and Business Cycles,” QJAE 8(1) 2005 - SUBSTANTIAL READ by writer 2026-11-01 (pro-index Cantillon/monetary framing; used only for “defenders formalize cheap money” gloss in ch26). Cited in: Chapter 26. https://cdn.mises.org/qjae8_1_4.pdf
- **SK58** - Barr, “Broken Clockism: The Skyscraper Curse is Bogus” (2017-11-05) - FULL READ by writer 2026-11-01: “at least 28 panics, crises, or severe downturns in the last 125 years, over twice as many as record-breaking buildings”; broken-clock adage. Cited in: Chapter 26. https://buildingtheskyline.org/skyscraper-curse-is-bogus/
- **SK59** - som.com, Aaron Mazeika, “Perfecting Structure: From X-Braced Steel to Concrete and Back” (2024-09-14) - FULL READ by writer 2026-11-01 (SOM’s own engineering retrospective): DeWitt-Chestnut 42-story framed tube; Hancock reached full height 1968 with the braced tube; industry shift from all-steel to reinforced concrete in the 1980s. Cited in: Chapter 9. https://www.som.com/story/perfecting-structure-from-x-braced-steel-to-concrete-and-back/
- **SK60** - Lee Gray, Elevator World 2-part series (2022-01/02) - FULL READ by writer 2026-11-01 (both parts): 1854 Crystal Palace demos documented in NY Tribune 1854-05-30 + Scientific American 1854-11-25; “All safe, gentlemen” “lacks verification”; “no evidence ties Barnum to funding Otis”. Cited in: Chapter 4. https://elevatorworld.com/article/elisha-otis-improved-elevator/ ; https://elevatorworld.com/article/elisha-otis-at-crystal-palace-part-2/
- **SK61** - taipei-101.com.tw official damper page (Wayback 2015 capture) - FULL READ by writer 2026-11-01: 660t, 5.5m sphere of 41 plates, suspended 87F-92F, eight steel cables 42m of 2000+ strands, passive TMD. Cited in: Chapter 10, Chapter 23. https://web.archive.org/web/20150402110347/http:/www.taipei-101.com.tw/en/observatory-damper.aspx
- **SK62** - Motioneering designer account (2023-04-26) - FULL READ by writer 2026-11-01: Shanghai Tower 1,000t TMD extending through five floors at top; eddy-current damping; first high-rise TMD of its type and world’s largest; damping 1%->3% of critical; occupant acceleration -45%; commissioned 2016. (Lu et al. 2016 doi:10.1002/stc.1882 abstract not retrievable 2026-11-01 - not cited for any claim). Cited in: Chapter 10. https://www.motioneering.ca/post/the-value-of-performance-testing-on-a-grand-scale
- **SK63** - Barr, “The People v. Jenney” working paper (2024-06-20) - SUBSTANTIAL READ by writer 2026-11-01: “public relations campaign to anoint Jenney as the inventor of the skyscraper”; HIB party walls load-bearing masonry, structure

"embedded in the masonry"; Tallmadge Report 1931 / Western Society of Engineers 1932 canonization; HIB demolished 1931 for the 46-story Field Building. NOTE: the "No beam, no frame" line sometimes attached to the Home Insurance Building traces to Larson & Geraniotis (1987), which could not be verified (paywalled); this book does not repeat it. Cited in: Chapter 5. https://buildingtheskyline.org/wp-content/uploads/2024/06/Barr_Revisiting-Jenney_WP_20June24.pdf

- **SK64** - Willis, "Fractious Firsts" (CTBUH 2020) - FULL READ by writer 2026-11-01: confirmation-bias framing; "the more specific these distinctions get, the less meaningful they become"; Equitable 1870 first office building to exploit a passenger elevator; Gilbert "a machine that makes the land pay"; Burj/Jeddah as bearing-wall kin of the 1874 Tribune. Cited in: Chapter 5, Chapter 8. https://skyscraper.org/wordpress/wp-content/uploads/2020/11/Fractious-Firsts.pdf
- **SK65** - historicengland.org.uk list entry 1270576, Shrewsbury Flaxmill Maltings Spinning Mill - FULL READ by writer 2026-11-01: five-storey Spinning Mill, construction commenced 1796/production began 1797, designed by Charles Bage; "first building in the world to successfully replace the timber beams and joists… with incombustible materials, namely cast and wrought iron and brick"; fireproof motive. Cited in: Chapter 6. https://historicengland.org.uk/listing/the-list/list-entry/1270576
- **SK66** - nist.gov WTC Towers Investigation FAQs - full read (impact times 8:46/9:02, collapses 9:58/10:28, 56/102 min mechanism, dislodged fireproofing, sagging trusses/bowing, no pancake theory, sprinklers severed, 2,735 deaths, 707 design-stage analysis, sprinklers-1500sqft design basis). Cited in: Chapter 29. https://www.nist.gov/world-trade-center-investigation/study-faqs/wtc-towers-investigation
- **SK67** - verticalurbanism.org (CTBUH/CVU own site) One WTC height ruling - full read (1,776ft architectural top ratified; spire counted; parapet 1,368ft = original Tower 1; roof slab 1,334'8"; Height Committee Nov 8; western-hemisphere tallest 541m). Cited in: Chapter 29. https://verticalurbanism.org/news-article/one-world-trade-center-height/
- **SK68** - sites.si.edu (Smithsonian) "Booming Out: Mohawk Ironworkers Build New York" - full read (tradition from 1880s St. Lawrence bridge; ESB/Chrysler/GWB/WTC; 700 families Brooklyn 1940s-50s; fear quote; 9/11 cleanup + rebuild). Cited in: Chapter 30. https://www.sites.si.edu/s/topic/0TO36000000TzV0GAK/booming-out-mohawk-ironworkers-build-new-york
- **SK69** - trellis.net Empire State retrofit case study (by project team members) - full read (2009 announcement, Clinton Climate Initiative + RMI + Malkin + JLL/JCI, 12-month study, 38% energy reduction target, $4.4M/yr savings, window remanufacture vs reseal, whole-building approach vs 10-15% ESCO jobs, split-incentive barriers). NOTE: the 6,514-window figure from an unfetched lead was NOT verified and was dropped from ch31.. Cited in: Chapter 31. https://trellis.net/article/empire-state-building-case-study-aggressive-energy-saving-retrofit/
- **SK70** - fs.usda.gov "World's tallest timber building opens" (2022-07-29) - full read (Ascent MKE 25 stories/284ft, tallest mass timber, passed Mjostarnet 18 stories, Forest Service Wood Innovations + FPL fire testing). Cited in: Chapter 31. https://www.fs.usda.gov/inside-fs/delivering-mission/apply/worlds-tallest-timber-building-opens
- **SK71** - en.wikipedia Ascent_MKE (2026-10-24) - infobox/lead only. Cited in: Chapter 31. https://en.wikipedia.org/wiki/Ascent_MKE
- **SK72** - tkelevator.com MULTI inauguration (2017-06-22) - full read (rope-less, multi-cabin loops, sideways, Rottweil test tower, OVG East Side Tower Berlin first customer; vendor source; the East Side installation never happened - see SK78). Cited in: Chapter 32. https://www.tkelevator.com/global-en/newsroom/press-releases/thyssenkrupp-makes-the-future-a-reality-inauguration-of-the-worlds-first-rope-less-horizontal-vertical-elevator-system-multi-67968.html
- **SK73** - en.wikipedia The_Illinois (2026-08-31) - substantial read (Wright 1957 A Testament, 528->365 stories, 18.46M sqft, 15,000 cars/100 helicopters, Adrian Smith lineage). Cited in: Chapter 32. https://en.wikipedia.org/wiki/The_Illinois
- **SK74** - motioneering.ca/our-work/taipei-101 - full read (designer page: "designed and built by Motioneering"; their figure 600t vs official 660t - keep official SK61 in prose). Cited in: Chapter 10. https://www.motioneering.ca/our-work/taipei-101
- **SK75** - en.wikipedia One_Vanderbilt - FULL READ by writer 2026-11-01: 62 usable stories above ground per the Skyscraper Center and building permits; air rights transferred from the landmarked Bowery Savings Bank Building (2010); as-of-right FAR 15 raised to 30 via the transit/public-realm improvement bonus; top floors advertised in July 2021 at up to $322 per square foot, then the city's highest asking rents. Cited in: Chapter 26. https://en.wikipedia.org/wiki/One_Vanderbilt
- **SK76** - therealdeal.com, "SL Green Asking Record $322 Per Square Foot at One Vanderbilt" (2021-07-21) - partial read by writer 2026-11-01 (rent figures verified in context): $322/sf for the top floor, $312 for the penultimate level, the priciest office asking rents in the city. Cited in: Chapter 26. https://therealdeal.com/new-york/2021/07/21/sl-green-asking-record-322-psf-at-one-vanderbilt/
- SK77 - ucl.ac.uk, UCL-Energy 'High-Rise Buildings: Energy and Density' project results (2017-06-13) - FULL READ by writer 2026-11-01: ~600 UK offices with metered electricity/gas records; buildings of 20+ storeys vs 6 or fewer: electricity use per m² +135%, fossil fuel +40%, carbon emissions more than doubled; effect survives correction for age, prestige (rateable value) and air conditioning; residential analysis across 12 London boroughs: gas use rises markedly with total building height; density/form: at equal floor area, courts can exceed slabs and slabs towers, up to 3:2:1 (Martin & March 1970s; confirmed by

Berghauser Pont & Haupt). Peer-reviewed office study behind it: Godoy-Shimizu et al., Building Research & Information 2018, doi:10.1080/09613218.2018.1479927 (excerpt level - abstract/search excerpts only); authors' causal attribution: likely greater exposure of taller buildings to cold, wind and sun, 'likely although not proven'; the 3:2:1 ratio is achievable density on the same site (theoretical, Martin & March; Dutch residential confirmation). Cited in: Chapter 31. https://www.ucl.ac.uk/bartlett/news/2017/jun/ucl-energy-high-rise-buildings-energy-and-density-research-project-results

- SK78 - elevatorworld.com, "On the EDGE at Berlin Friedrichshain-Kreuzberg" (2022) - partial read (elevator section): MULTI's first commercial use was originally planned for the EDGE East Side Tower; from late 2021 KONE installed 14 elevators there instead, including Germany's first eight double-deck elevators; the tower was completed in 2023 and handed over in January 2024. Cited in: Chapter 32. https://elevatorworld.com/article/on-the-edge-at-berlin-friedrichshain-kreuzberg/

## Consulted but not cited

Consulted during the work and read unless an entry says otherwise - SK50 was fetched but not yet read, as its entry records; the read sources informed the manuscript's judgments but support no specific sentence.

- **SK2** - encyclopedia.chicagohistory.org HIB - full read https://www.encyclopedia.chicagohistory.org/pages/200027.html
- **SK50** - en.wikipedia Collapse_of_the_World_Trade_Center (2026-10-29) - FETCHED, not yet read (for ch29) https://en.wikipedia.org/wiki/Collapse_of_the_World_Trade_Center