TSLA gideon lens

Tesla, Inc. (TSLA) - Gideon-Lens Equity Research

Date: 2026-04-28. Analyst: Codex ER2. Price: $377.56. Market cap: approximately $1.416 trillion. Fiscal year end: December 31.

VERDICT BLOCK

Verdict: PASS

Scorecard:

Gate	Result	Notes
Management	FAIL	Key-person, governance, related-party, and capital-allocation risks are material rather than provisional.
Moat	FAIL	Autonomy economics remain unproven while the visible auto profit pool has compressed.
P/E ≤ 15 on confident EPS at TTM + 5 calendar years	FAIL	base cushion -87.8%
Compounder Score	Audited 33 / 100	33/100; Tesla has real assets and energy/autonomy optionality, but audited ROIIC, disclosure, SBC, and valuation evidence do not support a current compounder score.
Business Quality Score	Audited 33 / 80	33/80; scale, net cash, energy storage, charging, and fleet assets earn credit, but falling ROIC, uncalculated ROIIC, auto margin pressure, and undisclosed autonomy economics cap quality.
20% Return UW Score	Audited 0 / 20	0/20; the controlled five-year model produces negative IRRs at the current price, and a 20% case would require unverified high-margin profit pools or an unrealistic valuation framework.

One-line thesis (or reason to pass): Tesla may still create autonomy upside, but current evidence shows pressured auto economics, unproven autonomy profit pools, and governance/key-person risks; both qualitative gates now fail.

Kill / trigger criteria:

- BUY trigger: no BUY while management and moat are FAIL; the mechanical base-case P/E 15 price is $46.14, implying an -87.8% gap versus $377.56.
- PASS triggers: Services and other growth below 15% YoY while consolidated operating margin remains below 6% and capex annualizes above $20B; Energy gross margin below 25% for two consecutive quarters with Energy revenue growth below 10% YoY; any large additional related-party capital commitment without tight shareholder approval.
- Upgrade to BUY conditions: audited or independently calculable autonomy, FSD, Robotaxi, or fleet-software gross profit of at least $5B annualized, cleaner related-party boundaries, and a price that clears P/E 15 on confident TTM+5y EPS.

Position sizing if bought: 0% today. The current price fails the discipline before position sizing begins.

ER2 stricter-gate recalibration (2026-05-28): Management moved from YELLOW to FAIL because key-person, governance, related-party, and capital-allocation risks are material rather than merely provisional; moat moved from YELLOW to FAIL because autonomy economics are unproven while auto margins have compressed. This top scorecard supersedes any softer gate phrasing elsewhere in the appended materials; the underlying evidence was reused, but the gate standard is stricter.

Stage 0 - Time Anchor

Today is 2026-04-28. Tesla's fiscal year ends December 31. The most recently reported quarter is Q1 2026, quarter ended March 31, 2026, released April 22, 2026 and reflected in the Q1 2026 Form 10-Q. The TTM anchor is Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026, giving TTM ending March 31, 2026. The forward horizon is TTM plus five calendar years, so the

valuation endpoint is March 31, 2031. Every forecast and P/E 15 reference in this report uses that five-year span, not a fiscal-year shortcut.

Stage 1 - Disqualifier Sweep

ROIC is yellow: Tesla showed exceptional historical returns, including a 50.5% FY2022 normalized ROIC in the data package, but FY2025 ROIC fell to 6.6%. FCF conversion is yellow: TTM FCF was $7.000B, but 2026 capex guidance above $25B pressures near-term conversion. Net debt / EBITDA is green: Tesla had $44.743B of cash and short-term investments against $9.229B of total debt and finance leases at Q1 2026. End-markets are green/yellow: EVs, energy storage, autonomy, and grid infrastructure have long runways, but auto pricing pressure is real. Governance is yellow: no accounting breakdown was found, but key-person risk, related-party transactions, and compensation scale are material. AI disruption exposure is yellow: Tesla is more AI-enabled than AI-replaced, but autonomy commoditization could erode the highest-value claim. Pricing power is yellow: Energy margin evidence is strong, while automotive/services margin compression argues against a clean pricing-power verdict.

Management - Summary

The original management appendix gave Tesla a YELLOW gate, not a clean PASS; under the stricter May 2026 ER2 rubric, the management gate is recalibrated to FAIL. The positive side is substantial: Elon Musk and the operating team built the Model 3/Y platform, global manufacturing scale, direct distribution, charging infrastructure, a large energy-storage business, and a credible AI/autonomy roadmap. Vaibhav Taneja's finance background is relevant because the next five years require disciplined control of liquidity, capex, related-party boundaries, and project returns. The balance sheet gives the team room to invest, and management has shown a willingness to discuss tariff pressure, energy deployment lumpiness, battery constraints, and capex pressure rather than hiding every operational issue.

The offset is that Tesla now asks shareholders to fund a much more capital-intensive transition before the highest-return businesses are separately proven. R&D rose from $2.6B in FY2021 to $6.4B in FY2025, and the Q1 2026 call raised expected 2026 capex to more than $25B. That might be correct if Robotaxi, FSD, chips, Optimus, energy, and internal AI assets create a high-return platform, but the current reported business does not yet show that outcome. Governance also carries a real haircut. The Q1 2026 SpaceX investment, xAI-related context, board dependence on Musk, and an unusually large CEO performance award all make this less clean than a normal Gideon-quality compounder. The practical management conclusion is FAIL under the hard-gate rubric: impressive execution exists, but capital allocation, key-person dependence, governance, and related-party boundaries need proof before the gate can even move back to YELLOW.

Moat - Summary

The original moat appendix landed at YELLOW; under the stricter May 2026 ER2 rubric, the main moat gate is recalibrated to FAIL. Tesla has real moat elements: brand, manufacturing scale, powertrain and battery expertise, direct customer relationships, Supercharger infrastructure, energy-storage deployment capability, fleet data, and a possible AI/autonomy loop. Energy is the cleanest current evidence. TTM Energy revenue was $12.449B and TTM Energy gross margin was 31.9%, a major improvement from negative gross margin in FY2021 and 29.8% in FY2025. Grid storage has a durable demand setup from renewable penetration, grid congestion, electrification, and data-center load.

The problem is blended-company evidence. Automotive and services/other still supplied $85.430B of the $97.879B TTM revenue base, and that business has faced major margin compression. Consolidated operating margin was about 5.0% on the TTM anchor, down sharply from the FY2022 peak. A company with unassailable pricing power would not normally need to absorb that degree of auto margin pressure. The 2046 test is credible but not decisive. A durable 2046 Tesla could be a physical AI and energy-infrastructure company selling vehicles, storage, fleet software, charging, Robotaxi services, and robots. The eroded 2046 version is also plausible: Tesla remains large but looks more like an advantaged EV and energy-equipment manufacturer while autonomy, charging, and storage economics become more competitive. That leaves the moat as real in pieces, but below the hard-gate standard for a 20-year compounder.

Stage 5 Synthesis - Headline Numbers

The synthesis is the decisive part of the report. It starts from QF-cleared TTM revenue of $97.879B, TTM operating income of $4.897B, GAAP net income of $3.926B, and diluted EPS of $1.09. Tesla does not disclose segment operating income, so the synthesis treats segment OI as a modeled allocation rather than a reported line. It preserves the reviewed segment appendices and refuses to insert standalone Robotaxi, FSD, Cybercab, Optimus, or AI infrastructure revenue lines without disclosed historical economics.

Case	FY+5 revenue	FY+5 OI	FY+5 NI	FY+5 EPS	EPS x 15	Cushion vs $377.56
Bear	$96.394B	$2.360B	$2.247B	$0.64	$9.53	-97.5%
Base	$134.157B	$13.014B	$11.051B	$3.08	$46.14	-87.8%
Bull	$179.447B	$28.055B	$23.106B	$6.43	$96.50	-74.4%

Base-case Automotive and services/other revenue reaches $104.986B with an 8.0% modeled operating margin. Base-case Energy revenue reaches $29.171B with a 21.0% modeled operating margin. Combined base revenue is $134.157B and combined operating income is $13.014B after a corporate/calibration expense. The model assumes no buybacks and carries a modest share-count increase because Tesla is reinvesting heavily and stock-based compensation remains material. Required FY+5 EPS for P/E 15 at the current price is $25.17. Base EPS of $3.08 is not close. Even bull EPS of $6.43 does not clear the gate. The 11 synthesis tie-outs pass arithmetically, but the investment gate fails on valuation.

Red Team

The red-team appendix is severe because it does not need Tesla to fail as a company. It only needs to show that the current price capitalizes a profit pool not yet visible in the controlled sources. The strongest bear point is that Tesla is priced like a disclosed high-margin autonomy/software platform, while the statements still show a pressured auto-led company plus a smaller, promising Energy business. The most fragile assumption is Automotive and services/other margin recovery through services, FSD, and Robotaxi monetization without separate disclosure. The Stage-5 number to haircut first is the Energy base operating margin of 21.0%, because low-cost competition, tariffs, project timing, and policy changes can pressure battery-storage economics. The forced upgrade signal is hard disclosure: at least $5B of annualized high-margin autonomy/software/Robotaxi gross profit with enough cost detail to show positive contribution after insurance, support, charging, cleaning, maintenance, safety operations, compute, and depreciation.

Kill / Trigger Criteria

- Keep PASS while base FY+5 EPS remains below $25.17 at the current price, or while the price remains far above 15x confident FY+5 EPS.
- Downgrade the business-quality view if Services and other growth falls below 15% YoY while consolidated operating margin stays below 6% and capex annualizes above $20B.
- Cut the Energy case if Energy gross margin falls below 25% for two consecutive quarters while Energy revenue growth is below 10% YoY.
- Revisit the moat and management gates if Tesla reports at least $5B annualized high-margin autonomy/software/Robotaxi gross profit and shows cleaner related-party capital-allocation boundaries.
- Revisit price only after the quality gates improve; the mechanical base-case P/E 15 price is $46.14.

Analyst Flags

Tesla does not disclose segment operating income, so segment OI and corporate residuals are modeled rather than reported. FSD, Robotaxi, Cybercab, Optimus, and AI infrastructure remain option value in this report unless and until Tesla discloses revenue, gross profit, cost-to-serve, and contribution economics. The synthesis used a live price of $377.56, so the P/E gate should be refreshed if the stock moves materially. The final verdict is PASS, not because Tesla lacks assets or ambition, but because ER2 requires underwritten earnings power at a disciplined price. On that test, TSLA fails decisively.

Appendix A - Company Primer

Tesla, Inc. - Company Primer

Source Discipline and Time Anchor

Stage 0 time anchor used verbatim:

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

Data Source Rule: live fetches only; do not use local data warehouse caches. Use quant_foundation.md for financials and fetch any needed company/business context live from official Tesla IR/SEC/FMP. If a live fetch fails, retry the identical call once; do not substitute cached data.

This primer uses `quant_foundation.md` as the controlling source for financial figures. Business description and management context are drawn from live Tesla Investor Relations and SEC sources: Tesla's FY2025 Form 10-K, Q1 2026 Form 10-Q, Q1 2026 Form 8-K/shareholder update, Q1 2026 production and delivery release, and a live FMP profile call for basic corporate metadata. The local `data_package.md` was inspected but was only a placeholder at the time of drafting, so it was not used.

Business Overview

Tesla is an electric-vehicle, energy storage, charging, software, AI, and robotics company whose reported economics still depend primarily on vehicle sales. The official segment structure is simple: automotive, which includes vehicle design, manufacturing, sales, leasing, regulatory credits, used vehicles, service, collision repair, paid Supercharging, insurance, parts and merchandise; and energy generation and storage, which includes battery storage, solar, leasing, financing, related services, and energy incentives. Tesla describes its current operating objective as bringing AI into the real world through Full Self-Driving (FSD) (Supervised), Robotaxi, and Bots such as Optimus, while continuing to design, manufacture, sell, and lease fully electric vehicles and energy products. Sources: [FY2025 10-K](https://ir.tesla.com/_flysystem/s3/sec/000162828026003952/tsla-20251231-gen.pdf), [Q1 2026 10-Q](https://ir.tesla.com/_flysystem/s3/sec/000162828026026673/tsla-20260331-gen.pdf), [Q1 2026 8-K update](https://ir.tesla.com/_flysystem/s3/sec/000162828026026551/tsla-20260422-gen.pdf), [Q1 2026 production and deliveries](https://ir.tesla.com/press-release/tesla-first-quarter-2026-production-deliveries-and-deployments), and live FMP `profile TSLA`.

The customer base spans consumers, fleets, energy users, utilities, commercial and industrial customers, and eventually ride-hailing users and robotics customers if the AI roadmap scales. Vehicle customers buy or lease Model 3, Model Y, Model S, Model X, Cybertruck, and in smaller commercial volumes Tesla Semi. They also buy recurring or usage-based services through the vehicle, the Tesla app, and the Supercharger network. Energy customers buy or lease Powerwall for homes and small commercial sites, Megapack for commercial, industrial, utility, and generation applications, and solar products including Solar Roof and retrofit panels. Large energy storage projects are typically project-based, with milestone payments and performance guarantees. That makes Tesla partly a consumer durables manufacturer, partly an infrastructure equipment supplier, and partly a software-enabled services company.

Tesla's go-to-market model differs from the traditional franchise dealer model. Vehicle sales are primarily direct through Tesla's website and company-owned stores, with galleries in some jurisdictions where direct sales are restricted. Tesla argues this model lets it control inventory, service, warranty feedback, pricing, customer education, and brand presentation. Energy products are sold through Tesla's website, stores, galleries, channel partners, and in some commercial cases power purchase agreement structures. Supercharging is both an ownership-enabler for Tesla vehicles and a direct service line as

paid charging expands and non-Tesla vehicles gain access in selected markets.

The business should not be read as a pure automaker only, but investors also should not ignore that autos remain the financial base. For the TTM period ending March 31, 2026, automotive revenues were $71.793 billion, services and other were $13.637 billion, and energy generation and storage was $12.449 billion, for total revenue of $97.879 billion. Consolidated TTM operating income was $4.897 billion, net income attributable to common was $3.862 billion, diluted EPS was $1.09, and free cash flow was $7.000 billion. The company had $44.743 billion of cash, cash equivalents and short-term investments at March 31, 2026 against $9.229 billion of total debt and finance leases. Those figures make clear that Tesla has substantial liquidity and scale, but its current earnings power is far smaller than its revenue scale would suggest because price, mix, incentives, fixed-cost absorption, R&D, SG&A, stock-based compensation, and AI infrastructure spend absorb a large share of gross profit.

Revenue Architecture

FY2025 revenue was $94.827 billion. On a reportable-segment basis, automotive and services/other generated $82.056 billion, or about 86.5% of total revenue, while energy generation and storage generated $12.771 billion, or about 13.5%. Tesla does not disclose segment operating income; the quant foundation therefore uses segment revenue, cost of revenue, and gross profit where segment data exists, and consolidated operating income only at company level.

FY2025 revenue line	Revenue ($mm)	% of total	What it represents
Automotive revenues	69,526	73.3%	New vehicle cash and financing deliveries, regulatory credits, and vehicle leasing.
Services and other	12,530	13.2%	Used vehicles, non-warranty maintenance and collision, paid Supercharging, insurance, parts, and merchandise.
Energy generation and storage	12,771	13.5%	Megapack, Powerwall, solar, leasing, financing, related services, and energy incentives.
Total revenue	94,827	100.0%	Consolidated Tesla revenue.

The automotive revenue line is still the core. It includes Model 3/Y volume products, Model S/X premium products, Cybertruck, early Tesla Semi volumes, regulatory-credit sales, and leasing. Vehicle sales revenue is recognized when control transfers to the customer, with separate treatment for software and connectivity obligations such as FSD maintenance, premium connectivity, over-the-air updates, and Supercharging programs. Tesla's model has an unusual software component for a car company: customers can buy certain features after delivery through the app or vehicle interface, and some features can be sold as subscriptions. That creates deferred revenue and potential high-margin revenue if feature adoption grows, but the current financial base remains the delivery of physical vehicles.

Services and other is economically mixed. Used vehicle revenue can be high-volume but lower-margin because Tesla must acquire and refurbish the vehicle. Non-warranty service, collision, parts, insurance, paid Supercharging, and merchandise can improve the ownership ecosystem and lifetime monetization, but they also carry labor, materials, claims, charging electricity, site, and support costs. Strategically, the line matters because a larger fleet increases the addressable base for service, insurance, connectivity, FSD, charging, and used-vehicle transactions. Financially, the line should not be automatically treated like software revenue; its cost base is tied to physical service delivery and used-car economics.

Energy generation and storage is the second reportable segment and the most visible non-auto profit contributor. Powerwall serves homes and smaller commercial facilities; Megapack serves commercial, industrial, utility, and energy generation customers, with installations scalable to gigawatt-hour size. Tesla also sells solar generation systems and Solar Roof, and began initial deliveries of a new residential retrofit solar panel in January 2026. The segment benefits from grid constraints, renewable penetration, data-center and AI load growth, and the value of dispatchable storage. It also has project timing risk: deployments can vary quarter to quarter based on logistics, customer milestones, permitting, construction, and battery supply.

Geographically, FY2025 revenue was $47.627 billion in the United States, $20.962 billion in China, and $26.238 billion in other international markets. That is roughly 50.2% U.S., 22.1% China, and 27.7% other international. The geographic mix matters because Tesla manufactures in the U.S., China, and Germany, sells into regions with different EV incentives and tariffs, and faces very different competitive intensity by market. China remains both a major revenue geography and a manufacturing base; Europe and other international markets add demand diversity but also expose Tesla to changing local content rules, tariffs, regulation, consumer incentives, and currency.

Unit Economics

A dollar of Tesla automotive revenue first has to cover battery cells and packs, vehicle materials, manufacturing labor, depreciation on tooling and machinery, factory overhead, inbound and outbound logistics, warranty reserves, tariffs, vehicle connectivity, FSD maintenance obligations, and portions of charging infrastructure costs associated with free charging programs. The gross margin then has to fund R&D, SG&A, restructuring charges where applicable, and corporate overhead. In FY2025, the automotive and services/other reportable segment generated $82.056 billion of revenue, $68.764 billion of cost of revenue, and $13.292 billion of gross profit, a 16.2% gross margin. For the TTM period ending March 31, 2026, that combined segment generated $85.430 billion of revenue and $14.692 billion of gross profit, a 17.2% gross margin.

The auto margin model has several moving pieces. Positive drivers include factory utilization, manufacturing redesign, material cost reductions, local production near local demand, software attachment, regulatory credits, leasing economics, and lower warranty or logistics costs. Negative drivers include price cuts, financing incentives, unfavorable mix, underutilized plants, tariffs, raw material inflation, warranty issues, new-product ramp costs, and competition. In 2025, automotive sales revenue fell versus 2024, reflecting lower cash deliveries and lower average selling price per unit driven by mix and customer incentives. Tesla also disclosed lower average cost per unit, but that was not enough to restore the automotive gross margin to the levels achieved during the 2021-2022 period.

Regulatory credits are unusually profitable because the incremental cost to transfer credits is negligible once Tesla has generated them through vehicle production and sales. FY2025 automotive regulatory credit revenue was $1.993 billion, down from $2.763 billion in FY2024. The line can materially support gross profit but is not under the same control as vehicle price or factory efficiency. It depends on regulation, Tesla's credit supply, competitors' compliance needs, and negotiated pricing. The 10-K also notes that government and regulatory actions, including OBBBA-related changes, restricted certain credit programs. For an investment case, credits should be modeled explicitly rather than blended into structural vehicle margin.

Services and other economics are tied to the size and age of the installed fleet. Used cars, service, collision, parts, paid Supercharging, and insurance all become larger as the fleet grows, but each carries different margin properties. Used vehicles consume working capital and have market-price risk. Service and collision require labor capacity and parts availability. Insurance can be attractive if Tesla's driving data leads to better risk selection, but it also introduces claims volatility and regulatory complexity. Paid Supercharging benefits from site scale and utilization, yet electricity, maintenance, real estate, and network support still matter. The important question is whether Tesla can turn services from a necessary ownership support function into a durable profit pool.

Energy generation and storage currently has better reported gross margins than automotive. In FY2025, energy generated $12.771 billion of revenue, $8.969 billion of cost of revenue, and $3.802 billion of gross profit, a 29.8% gross margin. For the TTM period ending March 31, 2026, energy generated $12.449 billion of revenue and $3.969 billion of gross profit, a 31.9% gross margin. In Q1 2026, energy gross margin reached 39.5% according to the Q1 10-Q, helped by lower average cost per unit for Megapack and Powerwall, lower materials costs, and one-time tariff-related benefits, although revenue fell year over year as deployments declined. The key judgment is whether high margins are structural as Megapack 3, Megablock, Lathrop, Shanghai, and Houston scale, or whether competition, tariffs, cell supply, and project mix pull margins lower.

Below gross profit, Tesla is spending aggressively. Q1 2026 R&D was $1.946 billion, up 38% year over year, driven by AI and other product roadmap programs plus higher stock-based compensation. Q1 2026 SG&A was $1.833 billion, up 47% year over year, reflecting stock-based compensation, employee and labor costs, professional services, operating expenses, and legal charges. Tesla expects 2026 capital expenditures to exceed $25 billion, driven by AI initiatives, compute infrastructure, data centers, manufacturing and R&D production lines, facilities, company-operated AI-enabled assets, and retail, service and charging footprint. The company generated $7.000 billion of TTM free cash flow through Q1 2026, but the forward capital plan makes free-cash-flow conversion one of the central issues for underwriting the stock.

Products, Platforms, and Operating Footprint

Tesla's consumer vehicle family consists of Model 3, Model Y, Model S, Model X, and Cybertruck. Model 3 and Model Y are the volume products. Model S and Model X are older premium products. Cybertruck is a pickup with differentiated design and manufacturing choices. Tesla Semi remains early in commercial production. The Q1 2026 update disclosed installed annual automotive capacity of more than 550,000 units in California for Model 3/Y, more than 950,000 in Shanghai for Model 3/Y, more than 375,000 in Berlin for Model Y, more than 250,000 in Texas for Model Y, more than 125,000 in Texas for Cybertruck, pilot production for Cybercab in Nevada, pilot production for Tesla Semi in Nevada, and Roadster in design development. Actual production rates depend on equipment uptime, component supply, factory upgrades, regulation, and other factors.

The energy platform consists primarily of Megapack and Powerwall, supported by solar products, inverters, software, and services. The Q1 2026 update listed Megapack capacity of 40 GWh in California, Megapack capacity of 20 GWh in Shanghai, Powerwall capacity of more than 6 GWh in Nevada, and a Texas Megapack facility under construction. The same update said production of Megapack 3 at the new Houston-area Megafactory remained on track for later in 2026. This footprint suggests Tesla is trying to make energy storage a manufacturing-scale business rather than an installation-led solar business.

The AI and autonomy platform is the most important strategic overlay and the hardest to value. Tesla offers FSD (Supervised), which still requires active driver supervision, and launched Robotaxi service in June 2025 according to the FY2025 10-K. The Q1 2026 update said Tesla received approval for FSD (Supervised) in the Netherlands in April 2026 and launched unsupervised Robotaxi rides in Dallas and Houston in April 2026. Tesla is also ramping AI training infrastructure, including Cortex 1 and Cortex 2 in Texas, continuing custom silicon work with Dojo 3, and preparing Optimus production capacity in California and Texas. These initiatives could create a service-driven business model with software and fleet-based profits, but they require large upfront investment and face regulatory, safety, adoption, and execution risks.

The company is increasingly vertically integrated. It manufactures vehicles, battery packs, battery cells, drive units, energy storage components, solar products, charging hardware, and selected AI infrastructure. It sources from thousands of suppliers and still relies on important battery partners such as Panasonic and CATL, while also investing in internal cell, cathode, LFP, and lithium refining capacity. Tesla's Texas lithium refinery began operations in January 2026. The vertical-integration thesis is that Tesla can reduce cost, improve supply assurance, and shorten product feedback loops. The risk is that vertical integration raises capital intensity and exposes Tesla to execution problems in businesses that have different learning curves from vehicle assembly.

Competitive Setting

Tesla competes in several different arenas at once. In vehicles, it competes with legacy automakers, Chinese EV specialists, new EV entrants, hybrids, plug-in hybrids, used internal-combustion vehicles, and public transportation alternatives. The 10-K states that the worldwide automotive market is highly competitive and becoming more so as established and new manufacturers enter electric and alternative-fuel vehicles, self-driving technology, services, and software. Competition can pressure deliveries, price, revenue, margin, market share, and customer acquisition cost.

Tesla's automotive advantages are brand, direct customer relationship, software update capability, charging infrastructure, manufacturing learning, battery and powertrain know-how, and scale in Model 3/Y. Its disadvantages are also visible: model concentration, volatile public narrative, exposure to incentive changes, high valuation expectations, and competition from companies with broader product portfolios, local political support, lower-cost supply chains, or deeper dealer and service footprints. The more Tesla prices for volume, the more the business looks cyclical and competitive; the more it prices for margin, the more it risks losing share in increasingly crowded EV markets.

In charging, Tesla's Supercharger network is both a consumer convenience advantage and a potential infrastructure services business. Tesla reports a growing global Supercharger network and offers access to non-Tesla vehicles in support of its mission, with major automakers adopting the North American Charging Standard in certain markets. The network can reduce range anxiety, support Robotaxi ambitions, and generate paid charging revenue. At the same time, opening the network reduces exclusivity, increases utilization demands, and requires continued capital and operating support.

In energy storage, competition comes from battery manufacturers, integrators, project developers, utilities, software providers, and other storage technology vendors. Tesla competes on price, energy density, efficiency, optimization, performance, brand, modularity, and scalability. Megapack's competitive position appears stronger than residential solar because grid-scale and commercial storage markets are growing with renewable penetration, grid congestion, and AI/data-center load growth. However, this is a project and equipment business exposed to battery costs, contract timing, tariffs, incentive structures, and customer concentration in large projects.

In autonomy and robotics, competition is broader and less mature. Tesla competes with autonomous-vehicle developers, ride-hailing platforms, AI labs, robotics companies, semiconductor firms, and automakers building their own assisted-driving stacks. Tesla's differentiated bet is that a large deployed vehicle fleet, vision-based AI, in-house inference chips, over-the-air software, charging infrastructure, and manufacturing scale can converge into autonomous mobility and robotics economics. The countercase is that regulatory approval, safety validation, edge-case performance, liability, customer trust, and hardware constraints delay or limit monetization.

Management and Governance Context

Tesla is led by Elon Musk as Chief Executive Officer and director, with Vaibhav Taneja as Chief Financial Officer and principal accounting officer. FMP's live profile also identifies Elon R. Musk as CEO and Tesla's headquarters as 1 Tesla Road, Austin, Texas. Tesla's management identity is unusually central to the investment case. The bull case often depends on Musk-led product ambition, speed, engineering culture, talent attraction, capital-market access, and willingness to enter adjacent markets. The bear case often focuses on governance risk, key-person concentration, public-company distraction, executive compensation, related-party complexity, and the risk that ambitious roadmaps outrun practical execution.

The Q1 2026 update frames Tesla's management priorities around AI infrastructure, Robotaxi, future robotics, new factories across battery and battery materials, Megapack 3, Cybercab, Tesla Semi, affordability, utility, supply-chain regionalization, and vertical integration. The Q1 10-Q also states that Tesla expects capital expenditures above $25 billion in 2026. That is an explicit capital allocation pivot: Tesla is not merely harvesting a mature auto business, but using the balance sheet and auto cash flows to fund a broader AI, autonomy, energy, and robotics strategy.

Governance and related-party context should be watched closely. The FY2025 10-K discusses the 2025 CEO Performance Award accounting and notes the Board's review of a shareholder proposal related to a potential xAI investment. The Q1 2026 10-Q disclosed that Tesla invested $2.00 billion in SpaceX common stock during the quarter. These facts do not by themselves prove value destruction or value creation, but they do show why investors must analyze related-party processes, board oversight, capital allocation standards, and whether non-core investments compete with Tesla's already large internal capital needs.

Historical Trajectory

Tesla was incorporated in 2003, formerly operated as Tesla Motors, changed its name to Tesla, Inc. in 2017, and IPO'd in 2010 according to live FMP profile data. The historical business transformation has been dramatic: from a premium EV pioneer to a global manufacturer with large factories in the U.S., China, and Germany, a major charging network, a growing energy storage business, and an AI-driven roadmap. The financial trajectory also shows two different periods. From FY2021 to FY2022, revenue scaled from $53.823 billion to $81.462 billion and the automotive and services/other gross margin was above 26%. From FY2023 through FY2025, revenue plateaued around the mid-to-high $90 billion range while auto gross margins compressed: total revenue was $96.773 billion in FY2023, $97.690 billion in FY2024, and $94.827 billion in FY2025.

This plateau does not mean the company stopped changing. Energy revenue more than doubled from $6.035 billion in FY2023 to $12.771 billion in FY2025, and energy gross margin rose from 18.9% to 29.8%. Services and other also grew from $8.319 billion to $12.530 billion over the same period. But the automotive line fell from $82.419 billion in FY2023 to $69.526 billion in FY2025. The mix shift is important: Tesla is becoming less purely auto-revenue dependent at the margin, yet auto remains the profit and cash engine that funds the rest of the portfolio.

The TTM window through Q1 2026 shows a partial rebound but not a full resolution. Revenue was $97.879 billion, above FY2025 but only modestly above FY2023 and FY2024 levels. Operating income was $4.897 billion, implying a 5.0% operating margin. Net income attributable to common was $3.862 billion, diluted EPS summed to $1.09, and free cash flow was $7.000 billion. Q1 2026 benefited from higher year-over-year automotive sales, improved total gross margin, and operating cash flow of $3.937 billion, but operating expenses rose sharply, other expense was a drag from foreign exchange and bitcoin mark-to-market impacts, and capex is set to rise materially.

Key Investment Questions

The first question is whether Tesla is primarily a car company, an energy storage manufacturer, or an AI/autonomy platform. The current P&L says it is still mainly a car company with a promising energy segment and expensive AI options. The market value likely embeds a much larger AI/autonomy and robotics outcome than current GAAP earnings support. A rigorous ER2 case must separate current earnings power from option value.

The second question is whether automotive margins can stabilize without sacrificing volume. Tesla can lower cost through manufacturing, supply-chain localization, product redesign, and scale, but competitors can pressure price and mix. The Model 3/Y franchise remains large, yet future growth may require lower-priced trims, Cybertruck scaling, Semi, Cybercab, international approvals, and continued demand in China, Europe, North America, APAC, and South America. Watch delivery growth, average selling price, incentives, inventory days, fixed-cost absorption, and regulatory-credit contribution.

The third question is whether energy storage can become a durable, high-margin second engine. The segment has grown quickly and now reports gross margins above automotive. The thesis depends on Megapack demand, battery cell supply, factory ramps in California, Shanghai, and Texas, project execution, software value, grid and AI-load growth, and

tariff/incentive effects. Quarter-to-quarter deployment volatility should be expected, but a sustained margin and backlog signal would materially improve Tesla's quality profile.

The fourth question is whether the AI capex cycle earns an adequate return. Management expects 2026 capex above $25 billion, much of it tied to AI compute, data centers, production lines, manufacturing, service, charging, and AI-enabled assets. If Robotaxi, FSD, Optimus, and related software services scale, that spending could be foundational. If timelines slip or adoption is limited, the spending could depress free cash flow and returns on invested capital for years.

The fifth question is governance and capital allocation. Tesla has ample liquidity, but it is funding a very broad opportunity set: autos, energy, Robotaxi, Cybercab, Semi, Optimus, compute, batteries, lithium refining, charging, insurance, services, and external investments. Investors need confidence that each capital dollar is being allocated with return discipline, especially given the CEO's centrality and related-party context.

The sixth question is valuation discipline. At the latest quant-foundation quote of $373.1401 and market capitalization of about $1.400 trillion, Tesla's valuation is not underwriting only the TTM EPS of $1.09 or TTM operating income of $4.897 billion. The stock requires large future profit pools from autonomy, energy, robotics, or a major auto margin rebound. The primer's core framing is therefore: current Tesla is a scaled, liquid, globally diversified manufacturer with improving energy economics and compressed auto earnings; prospective Tesla is an AI, mobility, robotics, and energy platform whose payoff remains unproven in audited financials.

Sources Used

- `quant_foundation.md`, QFR-cleared Wave 1 file in `C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.`. Used as controlling source for revenue, segment gross profit, TTM, cash flow, balance sheet, share count, and latest quote.
- Tesla FY2025 Form 10-K, filed January 28, 2026: [Tesla IR PDF](https://ir.tesla.com/_flysystem/s3/sec/000162828026003952/tsla-20251231-gen.pdf).
- Tesla Q1 2026 Form 10-Q, quarter ended March 31, 2026, filed April 22, 2026: [Tesla IR PDF](https://ir.tesla.com/_flysystem/s3/sec/000162828026026673/tsla-20260331-gen.pdf).
- Tesla Q1 2026 Form 8-K and First Quarter Update, dated April 22, 2026: [Tesla IR PDF](https://ir.tesla.com/_flysystem/s3/sec/000162828026026551/tsla-20260422-gen.pdf).
- Tesla Q1 2026 production, deliveries, and deployments press release, dated April 2, 2026: [Tesla IR](https://ir.tesla.com/press-release/tesla-first-quarter-2026-production-deliveries-and-deployments).
- Financial Modeling Prep live helper endpoint: `profile TSLA`, used for basic corporate metadata only.

Appendix M - Management Assessment

Tesla, Inc. - Management Assessment

Source discipline and time anchor

Data Source Rule followed: live fetches only; no local data warehouse caches were used. This appendix reads the DR-cleared `quant_foundation.md` and `data_package.md` for historical financials and capital allocation history. It also uses live SEC filings, Tesla official filings and update materials, and live FMP transcript pulls saved under `C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.\raw\`. Key files include Tesla's FY2025 Form 10-K, Q1 2026 Form 10-Q, 2025 definitive proxy statement, November 7, 2025 annual meeting Form 8-K, and FMP `earning-call-transcript` pulls for Q2 2024 through Q1 2026.

Stage 0 time anchor used verbatim:

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

1. Who is running the company

Tesla is still run around Elon Musk. The proxy identifies Musk as "Technoking of Tesla and Chief Executive Officer"; he has served as CEO since October 2008. He owns the largest strategic decisions in the company's history: the Model S and Model 3/Y scale-up, vertical manufacturing system, Supercharger network, Gigafactory build-out, energy storage ramp, FSD/autonomy program, Optimus robotics push, and the current pivot from a primarily vehicle-and-energy manufacturer toward a real-world AI, robotaxi, and robotics platform. This is not a professional-manager handoff story. The CEO remains the primary product architect, capital allocator, public communicator, recruiting magnet, and valuation anchor.

Vaibhav Taneja is CFO and has served in that role since August 2023. The 2025 proxy gives him a finance and accounting path inside Tesla: Chief Accounting Officer from March 2019, Corporate Controller from May 2018, Assistant Corporate Controller before that, and prior SolarCity finance roles. That history matters because Tesla's next five years require an accounting- and liquidity-aware CFO more than a classic acquisition CFO. The balance sheet is large, capex is rising, AI infrastructure and manufacturing projects are numerous, and related-party investments require controls that are credible to outside shareholders.

The proxy lists Tom Zhu as Senior Vice President, APAC and Global Vehicle Manufacturing, with deep operating history in Gigafactory Shanghai. That role is material because Tesla's bull case still depends on manufacturing throughput, cost reduction, and global localization even if the valuation narrative has shifted toward autonomy and robotics. Segment heads are less disclosed than at more conventional industrial companies; Tesla's earnings calls frequently include Lars Moravy on vehicle engineering, Ashok Elluswamy on AI/autonomy, and energy executives such as Michael Snyder, but Tesla does not give investors a full segment-P&L owner map.

Board accountability is led by Robyn Denholm, Chair of the Board. The 2025 proxy says the board had nine members as of September 17, 2025, with two women and one racially or ethnically diverse director. The board had added Jack Hartung, former senior Chipotle finance executive, as an independent director and Audit Committee member. The proxy states that each standing committee consists solely of independent directors, and each audit, compensation, nominating and disclosure committee member qualifies as independent under applicable rules. The red flag is not a lack of formal independence. The red flag is whether a formally independent board can discipline a founder-CEO whose personal influence is central to the company's strategy, talent base, investor base, and compensation architecture.

2. Tenure and operating track record

Musk has been CEO for more than 17 years and therefore fully owns Tesla's current strengths and weaknesses. The track record is extraordinary at the enterprise-creation level. The company went from a niche EV startup to a global manufacturer that generated FY2025 revenue of $94.827 billion and TTM revenue of $97.879 billion, per the quant foundation. Tesla built scaled EV manufacturing, a proprietary charging network, a software-defined vehicle fleet, and a profitable energy storage business. That is a rare operating record.

The first major decision to credit is the Model 3/Y and global manufacturing system. From the data package, FY2021 revenue was $53.8 billion and FY2023 revenue reached $96.8 billion. The automotive and services/other reportable segment grew from $51.0 billion of FY2021 revenue to $90.7 billion in FY2023. That scale-up produced exceptional returns during the peak period: the data package's normalized ROIC was 31.0% in FY2021, 50.5% in FY2022, and 19.7% in FY2023. The later margin decline does not erase the original execution.

The second major decision is the energy storage commitment. Energy revenue grew from $2.8 billion in FY2021 to $12.8 billion in FY2025, and gross margin improved from negative 4.6% to 29.8%. That is the clearest current example of Tesla converting a long-gestation manufacturing and product bet into improving economics. It supports a positive read on management's ability to persist through years of under-earning when the end market is structurally attractive.

The third major decision is the autonomy and AI reallocation. Management has chosen to increase R&D from $2.6 billion in FY2021 to $6.4 billion in FY2025 and to guide to more than $25 billion of 2026 capex, driven by AI infrastructure, data centers, manufacturing and R&D production lines, and company-operated AI-enabled assets. This is coherent with the public strategy, but it raises the burden of proof. TTM operating income was only $4.897 billion and TTM FCF was $7.000 billion. Management is asking shareholders to accept a step-up in capital intensity before the robotaxi, FSD subscription, semiconductor, and Optimus economics are separately proven.

There are also decisions that did not work as cleanly. Automotive gross margin compressed from 26.5% in FY2022 to 16.2% in FY2025 for the automotive and services/other reportable segment. Consolidated operating margin declined from 16.8% in FY2022 to 4.6% in FY2025. Roadster has been repeatedly delayed. Hardware 3 FSD capability is still uncertain enough that management has discussed the possibility of free upgrades if needed. Giga Mexico was paused amid tariff uncertainty. Tesla has generally acknowledged constraints and changed tactical direction, but the company often frames misses as timing on an ambitious path rather than as analytical errors. That is part of the Tesla management pattern: candid on operational bottlenecks, less candid on the probability distribution of long-range promises.

3. Capital allocation behavior

Tesla's capital allocation is internally funded growth, not capital return. Per the DR-cleared data package, capex was $8.0 billion in FY2021, $7.2 billion in FY2022, $8.9 billion in FY2023, $11.3 billion in FY2024, and $8.5 billion in FY2025. R&D was $2.6 billion, $3.1 billion, $4.0 billion, $4.5 billion, and $6.4 billion across the same years. Buybacks and common dividends were zero in each year. M&A cash outflow was immaterial except for $0.1 billion in FY2023 in the FMP annual cash-flow data.

That record is mostly disciplined. Tesla did not use buybacks to manage optics at a premium valuation. It did not lever the balance sheet for acquisitions. It preserved liquidity and funded factories, energy storage, AI compute, battery material projects, service infrastructure, charging infrastructure, and software. As of Q1 2026, cash plus short-term investments were $44.743 billion against total debt and finance leases of $9.229 billion. The company has balance-sheet optionality that many automakers do not.

The concern is capital-allocation sprawl. Q1 2026 cash flow showed purchases of property and equipment of $2.493 billion and an additional $2.002 billion SpaceX equity investment. The Q1 2026 Form 10-Q says Tesla recognized $87 million of revenue and $65 million of cost of revenue from SpaceX Megapack purchases and then invested $2.00 billion in SpaceX common stock, after a prior xAI preferred-share arrangement. Even if the investment is financially attractive, it increases related-party complexity at the exact moment when shareholders need capital discipline around Tesla's own AI, robotics, energy, and manufacturing opportunities. A $2.0 billion minority investment in a CEO-affiliated company is not disqualifying given Tesla's $44.7 billion liquidity base, but it is a governance haircut.

The 2026 capex guide is the main forward test. Management raised the 2026 expectation from over $20 billion on the Q4 2025 call to over $25 billion on the Q1 2026 call. CFO Taneja also warned that free cash flow may be negative for the remainder of 2026. A team with Tesla's manufacturing record gets some benefit of the doubt, but Gideon's standard is not "visionary capex"; it is capital compounded at high returns. FY2025 ROIC was only 6.6% in the data package. The capital allocation grade cannot be a clean PASS until AI/robotaxi/Optimus capex produces measurable returns rather than valuation narrative.

4. Compensation alignment

Tesla's incentive alignment is powerful but unusually concentrated. The 2025 proxy and November 7, 2025 Form 8-K show shareholders approved the 2025 CEO Performance Award. The award covers 423,743,904 restricted shares split equally into 12 tranches of 35,311,992 shares, equal to 12% of the adjusted share count in aggregate. The tranches require sustained market capitalization milestones and operational milestones, including 20 million Tesla vehicles delivered, 10 million active FSD subscriptions, 1 million bots delivered, 1 million robotaxis in commercial operation, and Adjusted EBITDA targets that rise to very high levels. The proxy says full achievement requires Tesla to reach at least $8.5 trillion of market capitalization and at least $400 billion of sustained annual Adjusted EBITDA. It also includes 7.5-year to 10-year retention mechanics, voting restrictions until tranches become earned, clawback tied to restatement, and CEO succession framework requirements for the final tranches.

This is highly aligned with shareholder value creation, but it is not a normal public-company pay plan. It may be necessary because Musk's opportunity cost and bargaining power are abnormal. It also increases single-person dependency and may validate the idea that Tesla's board must pay almost any price to retain him. The award is better than a time-vested grant because it ties value to outcomes, but the scale and related governance context keep the management gate from being clean.

For other executives, the proxy states Tesla generally uses salary and equity, has no cash bonus program for named executive officers, generally does not provide unusual perquisites or tax reimbursements, and has no severance or change-of-control arrangements for named executive officers. Taneja's 2024 award was approximately 80% stock options, and the proxy emphasizes at-risk equity rather than short-term bonus metrics. Stock ownership guidelines require named executive officers to hold shares equal to six times base salary and directors to hold five times the annual cash retainer. Pledging is restricted, though Tesla's amended policy still permits limited CEO pledging for tax and offset obligations tied to the 2025 CEO Performance Award. That pledging carve-out is understandable but still a market-risk issue if large blocks ever become collateral-sensitive.

5. Disclosure quality and candor

I reviewed the last eight live FMP transcripts available for the relevant period: Q2 2024, Q3 2024, Q4 2024, Q1 2025, Q2 2025, Q3 2025, Q4 2025, and Q1 2026. The pattern is consistent. Tesla management answers many hard operational questions directly, especially on capex, battery constraints, cost per vehicle, tariff exposure, energy deployment lumpiness, FSD adoption, regulatory sequencing, and hardware constraints. CFO Taneja is generally more grounded than Musk and often supplies the accounting or cash-flow framing that the call needs.

The candor positives are real. In Q2 2024, Musk acknowledged that his predictions on unsupervised FSD had been overly optimistic. In Q4 2024 and Q1 2026, management discussed battery pack capacity as a constraint rather than pretending demand or assembly capacity was the only issue. In Q1 2026, Taneja raised capex guidance to more than $25 billion and warned about pressure on free cash flow. Tesla also preserved explicit financial caveats in the Q1 2026 10-Q: tariffs, policy changes, energy margin pressure, Robotaxi infrastructure needs, and potential need for funding beyond operating cash flow during high capex periods.

The disclosure negatives are also real. Tesla does not separately disclose FSD revenue, Robotaxi revenue, Optimus revenue, Cybercab economics, or Megapack versus Powerwall revenue. Segment operating income is not disclosed; only segment gross profit is provided. Management's long-range language is often promotional and sometimes far ahead of observable revenue. Musk's statements about Optimus becoming Tesla's largest product, robotaxi scale, and potential company value can be directionally informative but are not guidance in the underwriting sense. The best way to use Tesla calls is to extract constraints, timing shifts, and capital commitments, not to model directly from CEO aspirations.

On tough related-party questions, management has been partially responsive but not fully satisfying. Analysts asked in 2024 about AI compute and talent allocation among Tesla, xAI, X, and other Musk ventures. Musk explained that GPU allocation was driven by Tesla data-center readiness and that xAI and Tesla solve different AI problems. That answer may be true, and the later SpaceX/xAI investment disclosure gives shareholders more formal information, but the structural conflict remains. Investors have to trust board process and special committee work more than they would at a company without overlapping founder-controlled ecosystems.

6. Strategic coherence

Tesla's stated mission is to "accelerate the world's transition to sustainable energy." The current strategy is coherent with that mission only if one accepts management's expanded definition of sustainable energy as including autonomous transport, grid

storage, AI compute, robotics, and vertically integrated manufacturing. The investment pattern supports the stated strategy: R&D rose sharply, 2026 capex is stepping up, energy storage capacity is expanding, Cybercab and Semi are entering production transition, Megapack 3 and Megablock are moving through the roadmap, and Tesla is investing in battery materials, AI training clusters, and semiconductor capability.

This is not a random collection of pivots. It is an integrated founder strategy: use vehicles and energy storage as manufacturing base, use the fleet as data and software distribution, use AI to convert hardware into higher-utilization assets, and use robotics to extend Tesla's real-world AI stack beyond cars. The strategic problem is not incoherence. The problem is proof. The current financial base is still mostly vehicles plus energy storage; the highest valuation claims depend on lines that are not yet separately disclosed or mature enough for hard underwriting.

7. Governance flags

Tesla has several governance positives: a formally independent committee structure, an independent chair, a strong cash balance, shareholder votes on the CEO pay architecture, no dual-class share structure, and no common dividend or buyback policy that masks weak investment returns. The board also tried to eliminate supermajority voting requirements in 2025, and the proxy describes repeated attempts to move governance closer to shareholder preference.

The flags are more important. First, key-person risk is extreme. The proxy itself argues that retaining and incentivizing Musk is fundamental to Tesla's future. That is both true and a governance warning. Second, related-party complexity has increased: SpaceX, xAI/X.AI, The Boring Company, Neuralink, and other Musk-affiliated entities appear in the ecosystem, and Q1 2026 included the $2.00 billion SpaceX investment plus ordinary-course Megapack sales to SpaceX. Third, the board remains classified under the proxy description, and the 2025 annual meeting Form 8-K says the management proposal to eliminate supermajority voting requirements was not approved. Fourth, CEO compensation remains tied to litigation history around the 2018 award and to an unusually large 2025 award. Fifth, Kimbal Musk is on the board, and the proxy notes the family relationship. These are not cosmetic issues for a Gideon-quality compounder.

I did not find a current material weakness or restatement flag in the reviewed Q1 2026 and FY2025 filings. The governance issue is not accounting breakdown. It is power concentration, related-party boundary management, and forecast reliability.

8. Peer comparison

Against BYD's Wang Chuanfu, Musk has the more radical software/autonomy upside, but Wang's capital allocation record in batteries and vehicle scale is cleaner on a manufacturing-per-dollar basis. BYD's model is less dependent on one public personality and has delivered brutal cost competition in core EVs. On five-year stewardship, Wang is the more disciplined manufacturing comparator; Musk is the higher-upside but higher-volatility allocator.

Against GM's Mary Barra, Musk ranks far ahead on EV manufacturing scale, software narrative, and energy storage adjacency. Barra has run a more conventional governance and disclosure model, but GM's Cruise experience and EV reappraisal charges show weaker capital allocation in autonomy and electrification. Tesla's board risk is higher; Tesla's operational ambition and realized EV scale are higher.

Against Rivian's RJ Scaringe, Musk has the proven scale record. Rivian remains in a pre-scale and cash-consumption phase even though Scaringe is a credible product founder. Tesla has already crossed the manufacturing chasm. The comparison reinforces that Tesla's management premium comes from execution history, not just vision.

9. Gideon management verdict

Management gate: YELLOW.

Tesla's management is too strong operationally to fail the gate. The team created a scaled EV and energy company, kept the balance sheet net cash, avoided buybacks at inflated valuation levels, built a high-margin energy storage business, and aligned CEO pay to extreme long-term performance hurdles rather than cash bonuses. For a 20-year compounder, the positive case is that Musk and the operating team can redirect Tesla's manufacturing system into autonomy, energy storage, AI infrastructure, and robotics faster than any conventional automaker.

But the gate cannot be a clean PASS. FY2025 ROIC fell to 6.6%, automotive margins compressed, 2026 capex is set to more than double FY2025 capex, and the highest-return claims are attached to products without standalone historical revenue or margin disclosure. Governance also carries a real haircut: key-person dependence is explicit, CEO-affiliated related-party investments are material enough to matter, and the 2025 CEO Performance Award is both highly aligned and unusually dilutive if successful. The board has process, but shareholder protection ultimately depends on whether that process can

constrain the founder when Tesla and Musk-affiliated interests overlap.

The practical Gideon conclusion is monitorable YELLOW. Upgrade toward PASS would require two things: first, measurable proof that the 2026-2028 AI, robotaxi, energy, and Optimus capex begins producing high-return revenue or cost advantages; second, cleaner related-party boundaries and more granular disclosure around FSD, Robotaxi, Optimus, and energy product economics. Downgrade to FAIL would be triggered by a large additional related-party capital commitment without tight shareholder approval, evidence that AI talent or compute is being diverted away from Tesla, or continued capex acceleration while ROIC remains structurally below Gideon's hurdle.

Source notes

- DR-cleared financial base: `C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.\quant_foundation.md` and `C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.\data_package.md`.
- SEC FY2025 Form 10-K: `https://www.sec.gov/Archives/edgar/data/1318605/000162828026003952/tsla-20251231.htm`.
- SEC Q1 2026 Form 10-Q: `https://www.sec.gov/Archives/edgar/data/1318605/000162828026026673/tsla-20260331.htm`.
- SEC 2025 definitive proxy: `https://www.sec.gov/Archives/edgar/data/1318605/000110465925090866/tm252289-12_def14a.htm`.
- SEC 2025 annual meeting Form 8-K: `https://www.sec.gov/Archives/edgar/data/1318605/000110465925108507/tm2530590d1_8k.htm`.
- Live FMP transcripts: TSLA Q2 2024, Q3 2024, Q4 2024, Q1 2025, Q2 2025, Q3 2025, Q4 2025, and Q1 2026, saved under `raw\TSLA_fmp_transcript_*_live.json`.

Appendix W - Moat and 2046 Durability

Tesla, Inc. - Moat and 2046 Durability

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Source Discipline and Time Anchor

Data Source Rule followed: live fetches only; no local data warehouse caches were used. Financial context is anchored to `quant_foundation.md` and the DR-cleared `data_package.md`. I also fetched live official/public sources for qualitative context: Tesla FY2025 Form 10-K, Tesla Q1 2026 Form 10-Q, Tesla Q1 2026 Form 8-K / shareholder update, Tesla Q1 2026 production and deliveries release, live FMP `quote TSLA` and `profile TSLA`, IEA Global EV Outlook 2025, IEA grid-scale storage and battery storage analysis, and a July 2025 J3400 / NACS market-development public filing. The segment appendices in this folder were stubs at the time of writing, so the per-segment moat assessment uses the DR-cleared data package, quant foundation, primer, and live official sources rather than uncompleted segment work.

Stage 0 time anchor used verbatim:

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

1. Moat Taxonomy Applied

Brand. Tesla has a real consumer brand, but the evidence is now mixed rather than clean. The brand still supports global awareness, direct demand generation, low historical advertising intensity, product launches without a conventional dealer network, and premium mindshare around EVs, software, charging, and AI. Tesla says its direct sales infrastructure helps it control inventory, warranty service, pricing, customer education, brand strength, and customer feedback, and its FY2025 10-K still says it historically achieved sales without relying on traditional advertising. That is genuine differentiation. The negative evidence is margin compression and share loss in increasingly broad EV markets. A brand with full pricing power would not normally show automotive/services gross margin falling from 26.9% in FY2021 to 16.2% in FY2025 while consolidated operating margin falls from 16.8% in FY2022 to 4.6% in FY2025. The right read is strong awareness and trust among EV buyers, not unassailable pricing power.

Cost and manufacturing scale. Tesla's manufacturing moat is meaningful but cyclical. The company has owned or controlled major production assets in the U.S., China, and Germany; official facilities include Gigafactory Texas, Fremont, Nevada, Berlin-Brandenburg, Shanghai, Megafactory Shanghai, Buffalo, and Lathrop. Tesla's 10-K emphasizes in-house design, test engineering, battery systems, automation, die-making, line-building, process simulation, vertical integration, supply-chain localization, and its Texas lithium refinery that began operations in January 2026. These assets matter because the EV race is ultimately a cost race. The weakness is that cost progress is being shared with customers and competed away. Tesla's own 10-K says the auto market is highly competitive and expected to become more so as established and new manufacturers enter EVs. Cost leadership is a moat only if Tesla can convert it into either volume growth or margin durability. The recent record shows cost learning but not durable margin capture.

Software, data, and fleet learning. Tesla's most important potential moat is the loop among installed vehicles, over-the-air updates, FSD, Robotaxi, inference hardware, training compute, and direct customer monetization. The Q1 2026 update says the latest FSD (Supervised) version improved long-tail edge-case handling, perception, model iteration speed, and inference latency; the same update highlights Cortex 1 and Cortex 2 AI training capacity, Dojo 3 custom silicon development, AI5 tape-out, and planned expansion of Robotaxi coverage. This is a potentially advantaged data and deployment loop because Tesla owns the vehicle hardware, software distribution channel, customer relationship, and service network. But it is not yet a fully proven economic moat: FSD, Robotaxi, Cybercab, and Optimus have no separately disclosed historical revenue lines;

FSD remains supervised for customer-owned vehicles; Robotaxi operations are early; and safety/regulatory approval is local, slow, and jurisdiction-specific. The moat is plausible, not banked.

Charging and network effects. Tesla's Supercharger network is a clearer moat than most auto hardware claims. Tesla describes a growing global network of industrial-grade high-speed chargers placed along travel corridors and dense urban centers, with paid or program-supported usage. The FY2025 10-K says all major automakers announced adoption of the North American Charging Standard in certain markets, and Tesla says it must expand the network to meet customer demand as other OEMs use Superchargers. The public J3400 / NACS timeline indicates automakers began gaining Supercharger access in 2024, non-Tesla native NACS vehicles and chargers arrived in 2025, expanded offerings are expected in 2026, and widespread use as the default passenger-vehicle charging connector is anticipated in 2027. That creates a network asset: more vehicles drive utilization, higher utilization can improve charger economics, and broad standard adoption can make Tesla infrastructure more important to the ecosystem. The offset is that opening the network reduces Tesla-owner exclusivity and forces capex, reliability, queue management, and service quality execution.

Switching costs. Vehicle switching costs are moderate. A Tesla owner may have an app, charging patterns, service history, software familiarity, FSD subscription or purchase, energy ecosystem products, and a used vehicle profile inside Tesla's ecosystem. Those costs are real but not enterprise-software-grade. A customer can switch vehicle brands at replacement, especially if NACS access becomes industry-standard and EV range/charging gaps narrow. Energy storage switching costs are higher at project level after installation because a utility-scale battery project embeds physical hardware, software, interconnection, warranties, service, and operating workflows. Robotaxi switching costs, if scaled, could be high for fleet operations, routing, cleaning, charging, teleoperations, insurance, maintenance, and customer demand density; today that is still prospective.

Regulatory, IP, and procurement. Tesla has regulatory assets in credits, vehicle safety compliance, energy incentives, grid participation, and autonomous-vehicle approvals, but regulation is not a pure moat. It can help Tesla because compliance, safety validation, state-by-state approvals, and grid interconnection create friction for smaller competitors. It can also hurt Tesla because EV credits, residential energy incentives, tariffs, direct-sales laws, ride-hailing licensing, and autonomous-vehicle rules can change abruptly. The FY2025 10-K says OBBBA curtailed IRA incentives, repealed individual EV and residential-energy credits, imposed more stringent requirements, and accelerated phase-outs, while energy-storage commercial credits may remain under revised rules. Regulatory complexity protects scaled operators, but it does not create a one-way moat.

2. Per-Segment Moat

Automotive and services/other. This segment is the majority of the business: TTM automotive revenues were $71.793B and services/other were $13.637B, so the combined automotive/services reportable segment generated $85.430B of the $97.879B TTM revenue base. The moat consists of brand, direct distribution, manufacturing scale, powertrain and battery integration, software update capability, charging, service footprint, installed fleet, and regulatory-credit generation. It is durable over five years because the installed base, factory network, and charging footprint cannot be replicated overnight. It is less obviously durable over 10-20 years because EV manufacturing is globalizing, Chinese OEMs are cost-competitive, legacy OEMs still have distribution/service breadth, and battery cost curves are industry-wide. The earliest signs of breakage are persistent delivery share loss, rising incentives, Model 3/Y price cuts that outpace cost declines, warranty/service deterioration, FSD attach-rate stagnation, or Supercharger congestion that damages the ownership experience.

Energy generation and storage. Energy is smaller but has the cleaner current moat signal. TTM energy revenue was $12.449B, and TTM energy gross margin was 31.9%, up from negative 4.6% in FY2021 and 29.8% in FY2025. Tesla's energy-storage products use vehicle component knowledge, modular battery design, power electronics, remote dispatch, firmware updates, Powerhub, and Autobidder. Megapack and Megablock are infrastructure products, not discretionary gadgets; buyers include utilities, commercial/industrial users, and generation developers. IEA describes batteries as the most scalable grid-scale storage technology and notes their seconds-level response makes them well-suited for grid stability and backup. This segment has a plausible 10-20 year runway because renewable penetration, grid congestion, data-center load, and electrification increase the need for dispatchable storage. The breakage signal is sustained gross margin compression from low-cost battery integrators, weak backlog, cell-supply constraints, project execution failures, or tariffs that make Tesla's cost position inferior.

AI/autonomy/Robotaxi/Optimus. This is not a reportable segment but it is central to the market's long-run Tesla thesis. The moat claim is that Tesla can turn its fleet, data, AI stack, custom chips, manufacturing base, charging, service network, and future Cybercab/Optimus factories into high-return software and fleet businesses. The company has made visible progress:

Robotaxi launched in 2025, the Q1 2026 update discusses unsupervised service in several Texas metros and safety-driver service in the Bay Area, FSD paid customers were nearly 1.3M according to the data package, and Tesla is preparing Optimus production lines. The weakness is economic proof. There is no standalone Robotaxi revenue line, no Optimus revenue line, and no audited evidence that these products can earn high returns at scale after safety, insurance, cleaning, maintenance, teleoperations, compute, capex, and regulatory costs. The moat is option-value-rich but not yet a pass/fail foundation for a 20-year compounding verdict.

Blended-company implication. The blended moat is weaker than Tesla's strongest narratives. Energy has improving gross margin and a durable demand setup, but it was only 12.7% of TTM revenue. Auto/services remain 87.3% of TTM revenue and carry the most competitive pressure. AI/autonomy could dominate the future but is not yet a disclosed profit pool. Therefore the equity should not be scored as if the whole company already has a software-platform moat. The correct blended verdict is: real assets, real brand, real infrastructure, a promising energy moat, and large AI optionality, but current consolidated earnings are still exposed to auto-cycle and EV-price competition.

3. Margin Persistence Evidence

The consolidated margin record is not a clean moat proof. Revenue rose from $53.8B in FY2021 to $94.8B in FY2025, but operating income fell from $13.7B in FY2022 to $4.4B in FY2025. Operating margin was 12.1% in FY2021, 16.8% in FY2022, 9.2% in FY2023, 7.2% in FY2024, and 4.6% in FY2025. TTM operating margin through March 31, 2026 was about 5.0%. That is a sharp compression, not margin persistence. The optimistic interpretation is that Tesla deliberately lowered price and funded AI, FSD, Robotaxi, Optimus, energy, batteries, and compute infrastructure during a transition period. The conservative interpretation is that a significant part of the automotive moat has already been competed down.

Segment gross margin gives a more nuanced picture. Automotive/services gross margin was 26.9% in FY2021, 26.5% in FY2022, 18.2% in FY2023, 16.9% in FY2024, 16.2% in FY2025, and 17.2% on the TTM window. That is weak evidence of pricing power, though the TTM rebound prevents a simple collapse narrative. Energy gross margin improved from -4.6% in FY2021 to 7.4% in FY2022, 18.9% in FY2023, 26.2% in FY2024, 29.8% in FY2025, and 31.9% on the TTM window. Q1 2026 energy gross margin was 39.5%, helped by lower Megapack and Powerwall unit costs and tariff-related benefits. Energy is the segment where margin persistence and expansion provide actual moat evidence.

The ROIC record reinforces the same point. Data package ROIC fell from 50.5% in FY2022 to 19.7% in FY2023, 12.1% in FY2024, and 6.6% in FY2025. A Gideon-quality moat should compound capital at high returns through competition. Tesla did that in the 2021-2022 window, but the 2023-2025 period does not yet prove durable high-return compounding. The balance sheet allows Tesla to keep investing, with $44.743B of cash and short-term investments at March 31, 2026, but the business must show that new invested capital in AI, energy, manufacturing, charging, and robotics can earn attractive incremental returns.

4. AI Disruption Stress Test

Automotive hardware is not a prompt-to-output workflow. AI can improve design, manufacturing, simulation, quality control, service diagnostics, procurement, customer support, and autonomy, but it cannot dissolve the need for physical factories, supply chains, regulatory certification, battery packs, charging, logistics, and service infrastructure. Tesla is more likely to be AI-enabled than AI-disrupted in the physical vehicle base. The risk is different: AI can lower the barrier for competitors to develop better ADAS, design vehicles faster, optimize plants, and match software features. If competitors close the software gap while Tesla remains exposed to vehicle price competition, the AI advantage narrows.

Energy storage is protected by chokepoint economics. The core value is physical capacity, interconnection, power electronics, battery management, warranties, dispatch software, and project execution. Foundation models may improve forecasting, bidding, maintenance, site design, and grid optimization, but the asset still must be manufactured, delivered, connected, and serviced. AI/data-center growth is likely to increase electricity demand and grid volatility, which could make storage more valuable. The most protected segment from AI disruption is therefore energy storage, provided Tesla remains cost-competitive in cells, packs, power electronics, and project delivery.

FSD, Robotaxi, and Optimus are the most exposed and the most advantaged by AI at the same time. Their product value is AI performance in the physical world. If Tesla's fleet data, inference chips, real-world training, regulatory learnings, charging/service infrastructure, and vertically integrated hardware translate into safer and cheaper autonomy, this becomes the company's most powerful moat. If foundation-model progress becomes commoditized and competitors can train equally safe systems using synthetic data, partnerships, third-party sensor stacks, or open autonomous-driving models, Tesla's data advantage could decay. The earliest observable break would be third-party autonomy systems reaching similar or better

safety and operating cost in multiple regulated markets while Tesla's FSD attach rate or Robotaxi expansion stalls.

5. The 2046 Test

Today is 2026-04-28. Twenty years forward is 2046-04-28. A credible 2046 Tesla business description is possible, but it is not the simple 2026 shareholder story extrapolated in a straight line.

In the durable 2046 version, Tesla sells and operates electric mobility, distributed and utility-scale energy storage, charging infrastructure, fleet software, autonomy services, and industrial robots. Consumers still buy Tesla vehicles, but the mix is lower-cost, highly automated, and more fleet-oriented than today's Model 3/Y-heavy base. Utilities, data-center operators, renewable developers, and commercial customers buy Megapack/Megablock-style systems with grid software and long-term service. Robotaxi fleets operate in many dense markets where regulation, safety data, cleaning, maintenance, charging, routing, insurance, and remote support have become operational barriers. Optimus exists either as a profitable industrial automation product or as a smaller internal manufacturing aid; it is not necessary for a YELLOW 2046 pass, but it would be necessary for the most aggressive bull case. The moat that still makes money is not "Tesla makes cars." It is the combination of battery/manufacturing scale, software-controlled physical assets, energy-storage deployment, charging/service infrastructure, and a large fleet-data/customer relationship loop.

Directionally, 2046 operating margin should be higher than today's 5.0% TTM level if the moat holds, because energy, software, fleet services, charging, and autonomy should mix up relative to pure auto hardware. But it should not be assumed to reach pure software margins. This will remain a physical-asset company with batteries, factories, field service, warranty, insurance, safety, charging, cleaning, and grid-interconnection costs. A reasonable 2046 durable case is a mid-teens consolidated operating margin business with more stable earnings than 2025-2026 because autos are a smaller share of profits and energy/fleet/software are larger. A high-20s margin case requires Robotaxi and autonomy to scale at exceptional unit economics and deserves separate proof in the synthesis, not moat credit here.

The eroded 2046 version is also credible. In that version, Tesla is a large but lower-return EV and energy equipment company. Chinese and local-market automakers have commoditized EV hardware, battery-pack costs are broadly available, public charging has become a regulated/competitive utility-like service, NACS standardization removed charging exclusivity, FSD became one of several acceptable autonomy stacks, and Tesla's Robotaxi rollout remained restricted by safety, liability, and local licensing. Energy storage grows, but low-cost cell suppliers and integrators compress hardware margins. Optimus remains capital-intensive and niche. In that bear 2046, Tesla still exists and sells products, but the business looks like an advantaged manufacturer, not a 20-year >20% ROIC compounder.

Probability judgment: the durable 2046 description is specific enough to avoid a FAIL, but the bear case is too plausible for a PASS. The most defensible 2046 verdict is YELLOW. Energy storage and charging/infrastructure give Tesla concrete durability. The AI/autonomy/robotics layer could create a much stronger moat, but the current financial statements do not yet prove it.

6. Competitive Threat Inventory

Threat	Mechanism	Segment(s) affected	Earliest observable signal	Plausibility
Chinese EV and battery cost pressure	China has the largest EV market, strong domestic OEMs, price-competitive EVs, and nearly 80% of global EV battery cell production in 2024 per IEA.	Automotive, batteries, energy storage	ASP cuts, incentive growth, share loss in China/Europe/emerging markets, lower gross margin despite lower unit costs	High
Autonomy commoditization or regulatory delay	Competing autonomy stacks improve while local safety, ride-hailing, insurance, and licensing slow Tesla rollout.	FSD, Robotaxi, Cybercab, services	Robotaxi market expansion misses plans, supervised FSD remains required, third-party systems match safety/cost	High
Energy storage margin compression	Low-cost battery suppliers/integrators, tariffs, cell shortages, and project competition reduce Megapack economics.	Energy generation and storage	Backlog weakens, deployments grow but gross margin falls toward auto levels, warranty/project issues rise	Medium-high
Charging exclusivity dilution	NACS standardization raises utilization but reduces Tesla-owner exclusivity and invites competing networks.	Supercharging, automotive ownership experience	Queueing, lower satisfaction, weaker Tesla purchase conversion from charging advantage, capex outruns charging profit	Medium

Threat	Mechanism	Segment(s) affected	Earliest observable signal	Plausibility
Governance and capital allocation drift	Broad AI, robotics, chip, SpaceX/xAI-related, and manufacturing initiatives consume capital before returns are proven.	Corporate, AI, all segments	FCF turns persistently negative, SBC dilution rises, related-party investments continue, ROIC stays single-digit	Medium-high

7. Pricing Power Verification

Tesla's pricing power is strongest in energy and weakest in core auto hardware. Auto evidence argues against a strong pricing-power verdict: FY2025 automotive sales revenue fell to $65.821B from $72.480B in FY2024 and $78.509B in FY2023; regulatory credits fell from $2.763B in FY2024 to $1.993B in FY2025; and the automotive/services gross margin fell to 16.2% in FY2025 from more than 26% in FY2021-FY2022. The Q1 2026 update showed a YoY operating margin improvement to 4.2%, helped by delivery growth, higher ASP excluding FX and mix, ancillary FSD sales/subscriptions, lower average cost per vehicle, and one-time benefits, but operating expenses tied to AI, SBC, and SG&A also rose. That is not clean recurring pricing power.

Energy pricing power is more credible but still needs monitoring. Energy gross margin reached 29.8% in FY2025 and 31.9% TTM; Q1 2026 energy gross margin increased to 39.5% because costs fell faster than revenue, aided by lower material costs and one-time tariff-related benefits. Tesla also says the long-term success of energy depends on volume growth and that deployments can vary significantly by project timing. That means pricing power should be verified by backlog, customer concentration, gross margin after tariffs normalize, and sustained margin despite Shanghai/Lathrop/Houston scale-up, not by one quarter.

Software and services pricing power remains asserted more than disclosed. Tesla reports FSD paid-customer growth and higher automotive ancillary sales from FSD sales/subscriptions, but no separate revenue, gross margin, churn, attach rate by cohort, or renewal economics. Supercharging has usage-based economics and can benefit from third-party access, but electricity, site, maintenance, reliability, and expansion capex matter. Insurance could be advantaged by vehicle data, but claim volatility and state insurance regulation prevent assuming software-like economics. The moat score therefore gives Tesla credit for monetization pathways, not for verified pricing power at scale.

8. Moat Verdict

Moat gate: YELLOW. Tesla has real moat elements: brand, scale manufacturing, direct customer access, battery and powertrain knowledge, Supercharger infrastructure, a growing energy storage platform, and a potentially powerful fleet-data/autonomy loop. But the current financial evidence is not strong enough for a clean PASS because automotive/services remain the dominant revenue base and have seen major gross margin compression, consolidated operating margin is only about 5% on the TTM anchor, ROIC has fallen sharply, and the most attractive AI/autonomy/robotics businesses are not yet separately proven in audited revenue or profit lines.

2046 test: YELLOW. A specific 2046 Tesla can be described: a physical AI and energy infrastructure company selling vehicles, grid storage, charging, fleet software, Robotaxi services, and possibly robots. The durable part is concrete in energy storage, charging, manufacturing, fleet/service infrastructure, and software-controlled physical assets. The reason the test is not PASS is that the 20-year high-return case depends on autonomy, robotics, and software economics that are still emerging, while the bear case of EV commoditization plus delayed autonomy remains highly plausible.

Practical conclusion. Tesla's moat is not imaginary, but it is transitional. The strongest current moat evidence is energy storage margin expansion and charging/network infrastructure. The weakest current evidence is auto pricing power. The swing factor for Gideon-style compounding is whether FSD/Robotaxi/AI can turn the installed vehicle base from a competitive hardware business into a high-return service and software platform before auto competition and capital intensity dilute returns.

Sources

- Tesla FY2025 Form 10-K, business, competition, infrastructure, incentives, MD&A, and facilities: https://ir.tesla.com/_flysystem/s3/sec/000162828026003952/tsla-20251231-gen.pdf
- Tesla Q1 2026 Form 10-Q, financial statements, energy gross margin, R&D/SG&A, liquidity, and cash flow: https://ir.tesla.com/_flysystem/s3/sec/000162828026026673/tsla-20260331-gen.pdf

- Tesla Q1 2026 Form 8-K / First Quarter Update, AI, FSD, Robotaxi, infrastructure, and financial summary: https://ir.tesla.com/_flysystem/s3/sec/000162828026026551/tsla-20260422-gen.pdf
- Tesla Q1 2026 production, deliveries, and deployments release: https://ir.tesla.com/press-release/tesla-first-quarter-2026-production-deliveries-and-deployments
- IEA Global EV Outlook 2025, trends and competition: https://www.iea.org/reports/global-ev-outlook-2025/trends-in-electric-car-markets-2
- IEA Global EV Outlook 2025, outlook and battery supply concentration: https://www.iea.org/reports/global-ev-outlook-2025/outlook-for-electric-mobility
- IEA grid-scale storage and battery storage context: https://www.iea.org/energy-system/electrical%20energy/grid-scale-storage and https://www.iea.org/reports/batteries-and-secure-energy-transitions/executive-summary
- J3400 / NACS public market-development timeline: https://www.reginfo.gov/public/do/eoDownloadDocument?documentID=943293&eodoc=true&pubId=
- FMP live endpoints fetched in this W run: `quote TSLA` and `profile TSLA`; DR-cleared financials from `quant_foundation.md` and `data_package.md`.

Appendix B1 - Automotive and Services/Other

Tesla, Inc. - Automotive and Services/Other Segment Deep Dive

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Data Source Rule included and obeyed: live fetches only; do not use local data warehouse caches. This appendix uses `C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.\data_package.md` as the controlling source for Tesla historical revenue, segment gross profit, TTM construction, and management commentary. I did not use local data warehouse caches. External live sources used only for competitive and regulatory context are cited inline: Tesla's Q1 2026 SEC Exhibit 99.1, Tesla's Q1 2026 production and delivery press release, IEA Global EV Outlook 2025, Cox Automotive's 2025 U.S. EV sales review, and EPA's February 2026 vehicle GHG final-rule page.

Stage 0 time anchor used verbatim:

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

0. Segment Boundary and Taxonomy Note

The segment analyzed here is Tesla's Automotive and services/other reportable segment. It includes automotive sales, automotive regulatory credits, automotive leasing, and services and other. The data package states that Tesla's two-reportable-segment structure was stable across FY2023-FY2025, with this segment comprising "vehicle sales/leasing, regulatory credits, used vehicles, service, Supercharging, insurance, parts and early Robotaxi activity" [data_package Section 1, FY2025 segment table]. The FY2025 10-K segment note gives comparable revenue, cost of revenue, and gross profit for FY2025, FY2024, and FY2023, and the quant foundation extends the same segment mapping back to FY2021 using official product-line disclosures [data_package Section 1, taxonomy investigation]. There is no recent restatement boundary to bridge.

Two caveats matter for modeling. First, Tesla discloses segment gross profit, not segment operating income. Any segment operating margin in this appendix is therefore an allocation model, not a reported company metric [data_package Section 3, Automotive and services/other table]. Second, Tesla does not separately disclose historical revenue for FSD, Robotaxi, Cybercab, Optimus, or Semi. The data package explicitly says those products are not separate dollar revenue lines in the FY2025 10-K or Q1 2026 10-Q and are included in automotive or services/other only where applicable [data_package Section 4, operational-disclosure table]. I therefore treat autonomy and robotics as option value and as possible contributors to services/other mix, not as independently verified historical revenue streams.

1. What This Segment Actually Is

This segment is Tesla's core vehicle and fleet monetization engine. The largest component is the sale of electric vehicles: Model 3, Model Y, Model S, Model X, Cybertruck, and the early production/ramp items such as Cybercab and Semi where they eventually ship to customers. Vehicle revenue is recognized through direct retail sales and leasing arrangements. Tesla's go-to-market is vertically integrated relative to traditional automakers: company-owned online ordering, retail locations, service centers, mobile service, charging, vehicle software updates, and a captive insurance offering in selected markets. This gives Tesla more control over pricing, merchandising, software attachment, service behavior, and fleet data than a dealer-led OEM, but it also puts more operating cost and customer-service responsibility on Tesla's own P&L.

The second component is automotive regulatory credits. Tesla generates credits by selling zero-emission vehicles and sells some of those credits to other manufacturers that need compliance assets. The line is volatile, policy-dependent, high gross-margin revenue. It does not require the same manufacturing effort as vehicle sales, but it is not a durable customer relationship or product moat in the same way as vehicle design, drivetrain, software, charging, and service. The data package

shows regulatory credits of $1.993B in FY2025, $2.763B in FY2024, and $1.790B in FY2023 [data_package Section 4, automotive regulatory credits row]. Because these credits depend on other automakers' compliance gaps and on government rules, they should not be capitalized like recurring software.

The third component is automotive leasing. Leasing revenue was $1.712B in FY2025, down from $1.827B in FY2024 and $2.120B in FY2023 [data_package Section 4, automotive leasing row]. Leasing is strategically useful because it can lower monthly payments, pull forward demand, and return vehicles to Tesla's used-vehicle and potential Robotaxi ecosystem. It also carries residual-value risk. If new Tesla pricing falls or used EV values weaken, lease economics can compress even if deliveries are stable. The data package does not provide lease portfolio detail by model, residual assumptions, or used-vehicle gross profit, so the leasing model here stays conservative.

The fourth component is services and other. This includes non-warranty service, used vehicles, Supercharging, parts, insurance, collision, and early Robotaxi activity. Services and other is the highest-growth disclosed line inside this segment: FY2025 revenue was $12.530B, up from $10.534B in FY2024 and $8.319B in FY2023 [data_package Section 4, services and other row]. The Q1 2026 update showed services and other revenue of $3.745B, up 42% year over year, and TTM services and other revenue of $13.637B [data_package Section 5, quarterly trend table; quant_foundation P4]. This line matters because it is the disclosed home for much of Tesla's fleet monetization beyond the initial vehicle sale.

2. Current Economics at the TTM Base

The controlling TTM base is March 31, 2026. The Automotive and services/other segment generated $85.430B of TTM revenue and $14.692B of TTM gross profit, implying a 17.2% gross margin [quant_foundation P2; quant_foundation P4]. Segment operating income is not disclosed. The product-level TTM revenue split that is actually disclosed is $71.793B of automotive revenues and $13.637B of services and other revenue [quant_foundation P4]. Within automotive revenues, Tesla discloses annual automotive sales, regulatory credits, and leasing, but the data package does not provide quarterly TTM sub-lines for those three components. For forward modeling only, I estimate the TTM sub-line starting points by applying the FY2025 automotive-revenue mix to the official TTM automotive revenue total. This keeps the segment total tied to the official TTM base while avoiding a fabricated quarterly sub-line history.

The resulting forward-model starting points are: automotive sales $67.967B, automotive leasing $1.768B, regulatory credits $2.058B, and services and other $13.637B. These four lines sum to the official $85.430B segment TTM revenue. The sales, leasing, and credit starting points are estimates, not reported TTM figures. [DATA GAP: Tesla's data package does not disclose Q2 2025-Q1 2026 automotive sales, regulatory credit, and leasing revenue separately; only total automotive revenue is provided for the TTM period.]

On units, Tesla's official April 2, 2026 production and delivery press release said Q1 2026 production was 408,386 vehicles and deliveries were 358,023 vehicles, with Model 3/Y representing 341,893 deliveries and Other Models 16,130 deliveries [Tesla Q1 2026 production and deliveries press release, https://ir.tesla.com/press-release/tesla-first-quarter-2026-production-deliveries-and-deployments]. I use that as a live official operating clarification, not as a replacement for the data package's financials. The mismatch between production and deliveries in Q1 2026 matters because it can signal inventory, logistics, mix, or demand timing. It also warns against treating a single quarter's revenue rebound as a clean long-term volume inflection.

Current economics are mixed. The segment remains large, global, and gross-profitable, but the margin structure has deteriorated sharply from the peak vehicle-cycle years. Segment gross margin was 26.9% in FY2021 and 26.5% in FY2022, then fell to 18.2% in FY2023, 16.9% in FY2024, 16.2% in FY2025, and 17.2% for the TTM period [data_package Section 3; quant_foundation P2]. The FY2025 segment revenue decline was 6.3%, and the FY2023-FY2025 segment revenue CAGR was negative 4.9% [data_package Section 3, Automotive and services/other row]. In plain terms, Tesla's core auto business is no longer a simple volume-growth and manufacturing-scale story. The current question is whether fleet software, autonomy, services, refreshed models, Cybercab, and lower-cost manufacturing can reverse the gross-margin compression without requiring capital intensity that consumes the incremental profit.

3. Unit Economics

Automotive unit economics start with average selling price, vehicle bill of materials, battery cost, labor, freight, warranty, manufacturing absorption, and mix. Tesla historically benefited from a small number of high-volume models, direct distribution, powertrain integration, over-the-air software, and scale in battery and drive-unit sourcing. The benefit is still visible in the company's ability to operate at global scale with a relatively narrow model lineup. The pressure is also visible: price cuts, mix shift toward lower-priced variants, Chinese OEM competition, U.S. tax-credit uncertainty, and aging platforms have

pulled segment gross margin down from the mid-20s to the high-teens [data_package Section 3, Automotive and services/other gross margin row].

Regulatory credits have unusually strong economics but weak durability. A dollar of credit revenue should carry high gross margin because Tesla is monetizing a compliance asset rather than building an incremental vehicle solely for that buyer. However, the buyer is not a recurring end customer; it is another automaker with a compliance shortfall. As incumbent and Chinese OEMs increase EV output, their need to buy credits should structurally fall. The policy backdrop also worsened. EPA's February 2026 final-rule page says the agency finalized rescission of the 2009 greenhouse-gas endangerment finding and repealed subsequent vehicle GHG standards for on-highway vehicles [EPA, https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-rescission-greenhouse-gas-endangerment]. Whatever happens in litigation or at the state level, that is a direct warning not to underwrite Tesla's credit revenue as a growing profit pool. In this model, regulatory credits decline in all cases.

Leasing has a different risk profile. It can support affordability and fleet control, but it creates exposure to residual values, remarketing, and financing spreads. The data package shows leasing revenue down from $2.120B in FY2023 to $1.712B in FY2025 [data_package Section 4, automotive leasing row]. A bull case can give leasing some growth if Cybercab, fleet customers, or subscriptions make retained vehicles more valuable. A bear case should assume leasing shrinks because weak used EV values and aggressive new-vehicle pricing pressure residual assumptions.

Services and other unit economics are becoming more important. Used vehicles can be lower margin and cyclical. Service, parts, Supercharging, software subscriptions, insurance, and autonomy-related activity can be better if attach rates, utilization, and loss ratios are favorable. The line's growth does not automatically mean margin expansion because some components, such as used vehicles and collision, may be working-capital and cost intensive. Still, services and other is the place where Tesla's installed fleet can turn into recurring economics. The data package shows services and other growing at a FY2023-FY2025 CAGR of 22.7% and Q1 2026 revenue up 42% year over year [data_package Section 4, services and other row; data_package Section 5, quarterly trend table]. That is the strongest disclosed growth signal inside the segment.

Operating margin must be modeled by allocation. At the consolidated TTM level, Tesla generated $4.897B of operating income on $97.879B of revenue [quant_foundation P4]. Total segment gross profit was $18.661B, so consolidated operating expenses absorbed about $13.764B of gross profit. The Automotive and services/other segment represented 87.3% of TTM revenue and 78.7% of TTM segment gross profit. I allocate roughly $11.3B of TTM operating expense to this segment for the current baseline, leaving a modeled current operating contribution of about $3.4B, or roughly 4.0% of revenue. This is not disclosed by Tesla; it is a synthesis assumption designed to bridge segment gross profit to the consolidated operating income pool. Forward case margins are compared to this modeled starting point, not to a reported segment operating margin.

4. Competitive Dynamics

Tesla competes in a global EV market that is still growing, but the shape of that growth has changed. IEA's Global EV Outlook 2025 says China represented almost two-thirds of global electric-car sales in 2024, with electric cars close to half of China's car sales [IEA Global EV Outlook 2025, https://www.iea.org/reports/global-ev-outlook-2025/trends-in-electric-car-markets-2]. This is good for EV adoption but difficult for Tesla's auto margins because China is also the most intense price-competition market. Domestic Chinese OEMs have rapid refresh cycles, lower-cost supply chains, strong local software ecosystems, and plug-in hybrid portfolios that can compete for value-conscious customers who are not ready for a pure BEV.

In the United States, Tesla remains the leader but has lost share. IEA noted that Model Y and Model 3 remained the two best-selling U.S. electric models, while new model entries drove Tesla's EV share down from 60% in 2020 to 38% in 2024 [IEA Global EV Outlook 2025]. Cox Automotive's 2025 year-end review said Tesla remained the U.S. EV leader, with nearly half of U.S. EV sales, but sales fell to about 589,000 in 2025, down 7% from 2024, while GM sold more than 150,000 EVs and gained share [Cox Automotive, https://www.coxautoinc.com/insights/q4-2025-ev-sales-report-commentary/]. That competitive pattern is central to the forecast: Tesla can still be the scale leader and still lose marginal pricing power.

The most direct vehicle competitors are BYD, Geely/Zeekr, SAIC, XPeng, NIO, Li Auto, Hyundai/Kia, GM, Ford, Volkswagen, BMW, Mercedes, and Toyota or Honda hybrids in markets where the consumer is choosing electrified efficiency rather than BEV purity. BYD is the hardest competitor in value EVs and plug-in hybrids because it combines battery integration, model breadth, domestic scale, export ambition, and pricing aggression. Hyundai/Kia and GM are the strongest signs that non-Tesla U.S. EV portfolios can finally gain volume if the product is priced and packaged correctly. European premium incumbents matter in high-end segments, but Tesla's real margin threat is less the Mercedes EQ buyer and more the global consumer who can now choose a cheaper, good-enough EV or hybrid.

For services, Tesla's main competitors are not traditional OEM service departments alone. They include independent repair networks, charging networks, insurance carriers, used-car platforms, and ride-hailing/autonomy networks. The Supercharger network remains a real asset, but charging is becoming more interoperable. Insurance can be differentiated if Tesla's vehicle data improves pricing and claims management, but it also exposes the company to regulated insurance economics. Used vehicles help monetize fleet churn, but weak residual values can turn that scale into margin pressure. Robotaxi competition includes Waymo and other autonomy fleets, but also Uber, Lyft, taxis, and privately owned vehicles. Tesla's differentiated claim is that it can deploy autonomy through a massive owner fleet and purpose-built Cybercab manufacturing. The bear case is that autonomy remains constrained by safety validation, regulation, compute cost, geography, and customer trust.

5. Segment-Level Moat

The segment has real advantages, but they are not uniformly strong across all lines. The strongest moat candidates are installed fleet scale, vertical integration, software iteration, charging access, manufacturing learning, battery know-how, and brand awareness. These advantages can lower customer acquisition cost, support services attachment, improve data loops, and give Tesla a distribution channel for software and autonomy. They are most defensible if Tesla can convert the fleet into high-margin recurring revenue. A vehicle-only Tesla has a much weaker moat because auto manufacturing is capital intensive, cyclical, and increasingly crowded.

The weakest moat line is regulatory credits. The credit business is profitable because of regulation, not because Tesla controls a customer relationship or proprietary product. Its durability is poor because the revenue pool can shrink when competitors produce more EVs or when rules change. Leasing is also not a moat by itself. It can be a tool, but the economics depend on pricing, residuals, and capital markets. Vehicle hardware has a moderate moat but not a software-like moat. Tesla's manufacturing scale, drivetrain efficiency, and charging ecosystem matter, but consumers now have more EV alternatives, and the industry can copy many physical features over time.

Services and other has the most interesting medium-term moat. If Tesla's fleet keeps growing and if FSD, Supercharging, insurance, parts, service, used vehicles, and Robotaxi monetization attach to that fleet, services and other can become a compounding revenue layer. The data package's FSD paid-customer commentary is important: Q3 2025 paid base about 12% of fleet, Q4 2025 nearly 1.1M paid customers, and Q1 2026 nearly 1.3M paid customers [data_package Section 4, operational-disclosure table]. That is not yet a disclosed revenue line, but it is evidence that the fleet can be monetized beyond the initial sale.

The key moat question is whether autonomy is real enough and broad enough to change segment economics by 2031. If it is, the moat improves because Tesla would own hardware, fleet software, data, distribution, and a lower-cost autonomous vehicle platform. If it is not, the segment remains an auto OEM with a strong brand and good manufacturing skills, but also with normalizing margins. The base case gives Tesla credit for services and software mix improvement, but not for a fully transformed Robotaxi profit pool. The bull case is where Cybercab, FSD subscriptions, and fleet services start to look like a platform. The bear case is where the auto line stays competitive and services growth is real but not high-margin enough to offset hardware pressure.

6. Historical Growth Rates Reproduced From the Data Package

The table below uses the data package's disclosed FY2023-FY2025 product rows. The template calls for FY-3/FY-2/FY-1 and a three-year view; because the data package gives the last three fiscal-year points, the CAGR shown is the FY2023-FY2025 two-year CAGR across those three points. No back-solved historical dollar estimates are included.

Product / sub-segment	FY2023 rev	FY2024 rev	FY2025 rev	FY2023-FY2025 CAGR	Most recent YoY	Data package cite
Automotive and services/other segment total	$90.738B	$87.604B	$82.056B	-4.9%	-6.3%	[data_package Section 3, Automotive and services/other reportable segment row]
Automotive sales	$78.509B	$72.480B	$65.821B	-8.4%	-9.2%	[data_package Section 4, Automotive sales row]
Automotive regulatory credits	$1.790B	$2.763B	$1.993B	5.5%	-27.9%	[data_package Section 4, Automotive regulatory credits row]
Automotive leasing	$2.120B	$1.827B	$1.712B	-10.1%	-6.3%	[data_package Section 4, Automotive leasing row]
Services and other	$8.319B	$10.534B	$12.530B	22.7%	18.9%	[data_package Section 4, Services and other row]

Internal arithmetic checks:

Row	Check
Segment total	$87.604B x (1 - 6.3%) = $82.056B, within rounding.
Automotive sales	$72.480B x (1 - 9.2%) = $65.821B, within rounding.
Regulatory credits	$2.763B x (1 - 27.9%) = $1.993B, within rounding.
Automotive leasing	$1.827B x (1 - 6.3%) = $1.712B, within rounding.
Services and other	$10.534B x (1 + 18.9%) = $12.530B, within rounding.

Recent-quarter context from the data package shows the same divergence. In Q1 2026, total automotive revenue was $16.234B, up 16% year over year, while services and other was $3.745B, up 42% year over year [data_package Section 5, quarterly trend table]. TTM automotive revenue was $71.793B and TTM services and other revenue was $13.637B [quant_foundation P4]. This creates a split forecast problem: vehicle revenue has shown recent recovery from a weak base but remains below the FY2023 annual peak, while services and other is still compounding rapidly from a smaller base.

7. Management Guidance Quoted From Data Package Section 6

The data package contains the relevant management commentary. I use short excerpts below and interpret them against the TTM base.

Source row	Quote excerpt	Interpretation
Q1 FY2026 call, Elon Musk	"just started production of Cybercab"	Cybercab is moving from concept to production transition, but early production is not the same as scaled revenue.
Q1 FY2026 call, Vaibhav Taneja	"highest Q1 order backlog in over 2 years"	Management is arguing demand improved from the weak 2025 base. The base case can allow modest vehicle growth, but not a straight return to peak margins.
Q1 FY2026 call, Vaibhav Taneja	"biggest limiter continues to be our battery pack capacity"	Vehicle, Semi, Cybercab, and energy ramps can be battery constrained. This raises reinvestment needs and capex risk.
Q1 FY2026 call, Vaibhav Taneja	"FSD as a product"	Management is reframing the vehicle as the delivery mechanism for software monetization. This supports services/other growth assumptions, not a separate historical FSD revenue line.
Q4 FY2025 call, Elon Musk	"fully autonomous vehicles" in a large part of the U.S.	This is an ambitious 2026 autonomy target. It is treated as option value and not as a guaranteed revenue stream.
Q4 FY2025 call, Lars Moravy	"CyberCab are going to change" market size and mix	Management expects Cybercab to expand the addressable market. The bull case reflects this; base case waits for proof.
Q2 FY2025 call, Elon Musk	"launching autonomous ride-hailing" broadly	The statement supports a Robotaxi option, but Q3-Q1 commentary still suggests staged validation and geography-by-geography rollout.
Q1 FY2026 call, Elon Musk	"Optimus will be our biggest product"	Optimus is not in historical segment revenue. It is a long-run wildcard, not a 2031 base-case segment revenue line here.

There is no management quote in the data package that gives a numeric 2031 revenue target for automotive, services and other, FSD, Robotaxi, Cybercab, or Optimus. There is also no disclosed target margin for this reportable segment. Therefore the forward model uses management commentary only as directional evidence: demand has improved from a weak base, battery capacity is a constraint, FSD is strategically central, Cybercab/Semi are production-transition items, and Optimus is an option with no disclosed revenue. [DATA GAP: no management-provided segment revenue or operating margin target for March 31, 2031.]

8. Forward Growth Assumptions From TTM Base to March 31, 2031

The segment forecast starts from official TTM segment revenue of $85.430B. As noted above, TTM automotive sub-lines are estimated using FY2025 mix because the data package provides only aggregate TTM automotive revenue. The official TTM

total controls the model.

Base Case Growth Assumptions

Product	TTM starting revenue	Historical marker	Latest YoY marker	Mgmt FY+1 guide	Base CAGR TTM to TTM+5y	March 31, 2031 revenue	Justification
Automotive sales	$67.967B est.	FY2023-FY2025 CAGR -8.4%	FY2025 -9.2%; Q1 2026 total auto +16%	backlog improved; battery capacity constrained	3.0%	$78.793B	Modest recovery from depressed 2025, helped by Model Y refresh, Cybercab/Semi transition, and global EV growth, but constrained by competition and ASP pressure.
Automotive leasing	$1.768B est.	FY2023-FY2025 CAGR -10.1%	FY2025 -6.3%	no numeric guide	1.0%	$1.858B	Leasing stabilizes as affordability tool, but residual risk prevents aggressive growth.
Regulatory credits	$2.058B est.	FY2023-FY2025 CAGR 5.5%	FY2025 -27.9%	no numeric guide	-8.0%	$1.356B	Credits decline as competitors produce EVs and U.S. policy support weakens.
Services and other	$13.637B	FY2023-FY2025 CAGR 22.7%	Q1 2026 +42% YoY	FSD as product; Robotaxi staged	11.0%	$22.979B	Fleet growth, service, Supercharging, insurance, FSD subscriptions, and early Robotaxi contribution support double-digit growth, but growth decelerates from current rates.

Base case segment revenue reaches $104.986B by March 31, 2031, a total segment CAGR of about 4.2% from the TTM base. The vehicle line is not assumed to regain FY2023-like growth. The base case is deliberately centered on services and other as the growth engine because that is where the disclosed historical growth is strongest and where the FSD/Robotaxi strategy would first appear in reported revenue.

Bull Case Growth Assumptions

Product	TTM starting revenue	Historical marker	Latest YoY marker	Mgmt FY+1 guide	Bull CAGR TTM to TTM+5y	March 31, 2031 revenue	Justification
Automotive sales	$67.967B est.	FY2023-FY2025 CAGR -8.4%	FY2025 -9.2%; Q1 2026 total auto +16%	Cybercab and Semi production transition	9.0%	$104.576B	Cybercab, lower-cost manufacturing, refresh cycle, and broader EV adoption restore volume growth and offset ASP pressure.
Automotive leasing	$1.768B est.	FY2023-FY2025 CAGR -10.1%	FY2025 -6.3%	no numeric guide	7.0%	$2.479B	Leasing becomes a fleet-control and affordability tool, supported by stronger residual expectations if autonomy increases vehicle utility.
Regulatory credits	$2.058B est.	FY2023-FY2025 CAGR 5.5%	FY2025 -27.9%	no numeric guide	-3.0%	$1.767B	Credits erode slowly because state and non-U.S. regimes keep some compliance value alive.
Services and other	$13.637B	FY2023-FY2025 CAGR 22.7%	Q1 2026 +42% YoY	FSD and Robotaxi focus	18.0%	$31.198B	FSD paid customers, Robotaxi miles, Supercharging, insurance, service, and used vehicles compound together; Cybercab creates a platform-like services layer.

Bull case segment revenue reaches $140.021B, a segment CAGR of about 10.4%. This is the case where Tesla's autonomy strategy materially changes the economics. It still does not assign a separate Optimus product revenue line because the data

package contains no historical revenue line or numeric production/revenue guide. Optimus remains qualitative upside unless a later synthesis agent chooses to model it separately as a new segment.

Bear Case Growth Assumptions

Product	TTM starting revenue	Historical marker	Latest YoY marker	Mgmt FY+1 guide	Bear CAGR TTM to TTM+5y	March 31, 2031 revenue	Justification
Automotive sales	$67.967B est.	FY2023-FY2025 CAGR -8.4%	FY2025 -9.2%; Q1 2026 total auto +16%	backlog improved, but capacity constrained	-3.0%	$58.366B	China price pressure, U.S. incentive rollback, slower refresh benefit, and global competition overwhelm Cybercab/Semi contribution.
Automotive leasing	$1.768B est.	FY2023-FY2025 CAGR -10.1%	FY2025 -6.3%	no numeric guide	-4.0%	$1.441B	Weak residual values and financing pressure shrink leasing.
Regulatory credits	$2.058B est.	FY2023-FY2025 CAGR 5.5%	FY2025 -27.9%	no numeric guide	-15.0%	$0.913B	Federal deregulation and competitor EV output reduce credit demand sharply.
Services and other	$13.637B	FY2023-FY2025 CAGR 22.7%	Q1 2026 +42% YoY	FSD as product; Robotaxi aspiration	5.0%	$17.405B	Fleet services still grow, but FSD/Robotaxi adoption disappoints and used-vehicle/service mix limits margin.

Bear case segment revenue falls to $78.125B by March 31, 2031, a negative 1.8% segment CAGR. This is not a collapse scenario. It is a scenario where Tesla remains a major EV manufacturer but does not convert the installed fleet into enough high-margin recurring revenue to offset hardware price competition and credit decline.

9. Forward Operating Margin Assumptions

Tesla does not disclose segment operating income. The margin assumptions below are modeled operating contribution margins after allocating segment-level operating expense, not reported Tesla segment margins. The reported historical anchor is segment gross margin: 26.9% in FY2021, 26.5% in FY2022, 18.2% in FY2023, 16.9% in FY2024, 16.2% in FY2025, and 17.2% for TTM March 31, 2026 [data_package Section 3; quant_foundation P2]. The modeled current operating contribution margin is about 4.0%, derived by allocating most consolidated opex to this segment because it contains vehicle engineering, autonomy, sales/service infrastructure, insurance, and fleet operations.

Case	2031 modeled gross margin	2031 allocated opex / revenue	2031 modeled operating margin	Mechanism
Bear	16.0%	14.0%	2.0%	Hardware price pressure and under-absorbed AI/autonomy investment offset services growth; credits decline; used vehicles and service mix do not expand margin.
Base	20.5%	12.5%	8.0%	Vehicle gross margin recovers modestly from TTM, services/software mix rises, but AI compute, factory ramp, and customer support keep opex high.
Bull	25.0%	11.0%	14.0%	Cybercab/FSD/services mix creates higher gross margin, manufacturing absorption improves, and opex scales against a larger installed fleet.

The base case requires about 400 basis points of operating-margin improvement from the modeled current contribution margin. The mechanism is not simple price increases. It requires services and other to rise from about 16% of segment revenue at TTM to about 22% by 2031, regulatory credits to become less important, and vehicle gross margin to recover without a return to the FY2021-FY2022 pricing environment. That is achievable but not automatic.

The bull case requires stronger proof: autonomy must create revenue with software-like or network-like margins, Cybercab must avoid becoming a low-margin hardware program, and Tesla must keep opex intensity from rising with AI compute and robotics spending. Management's Q1 2026 capex commentary in the data package points the other way in the near term: more than $25B of 2026 capex expected, with AI compute, battery, factories, and robotics all competing for capital [data_package Section 6, AI/capex commentary; data_package Section 7]. Therefore the bull margin is not just a volume story; it is a proof-of-platform story.

The bear margin assumes that the company can still earn some operating profit in this segment because services and other grows and Tesla remains scaled. But it also assumes that regulatory credits fade, vehicle ASPs stay pressured, leasing residuals are weak, and AI/autonomy cost remains mostly expense rather than monetized revenue. This is a realistic downside case because the segment's disclosed gross margin was already only 16.2% in FY2025 [data_package Section 3].

10. Segment Rollup

The rollup below sums the product-level assumptions from Section 8 and applies the modeled operating margins from Section 9. Totals are in billions of dollars. Because TTM automotive sales, leasing, and regulatory-credit sub-lines are estimated from FY2025 mix, the product-line forecast should be used as a modeling bridge; the official starting control is the segment total of $85.430B.

Case	Automotive sales	Leasing	Regulatory credits	Services and other	Segment TTM+5y revenue	Modeled op margin	Segment TTM+5y op income
Bear	$58.366B	$1.441B	$0.913B	$17.405B	$78.125B	2.0%	$1.562B
Base	$78.793B	$1.858B	$1.356B	$22.979B	$104.986B	8.0%	$8.399B
Bull	$104.576B	$2.479B	$1.767B	$31.198B	$140.021B	14.0%	$19.603B

Arithmetic tie-out: each case's revenue equals the sum of the four product lines above. Bear case: $58.366B + $1.441B + $0.913B + $17.405B = $78.125B. Base case: $78.793B + $1.858B + $1.356B + $22.979B = $104.986B. Bull case: $104.576B + $2.479B + $1.767B + $31.198B = $140.021B. Operating income equals revenue multiplied by modeled operating margin: bear $78.125B x 2.0% = $1.562B; base $104.986B x 8.0% = $8.399B; bull $140.021B x 14.0% = $19.603B.

The probability-weighted segment outcome is $103.9B of revenue and $8.6B of modeled operating income if probabilities are bear 30%, base 50%, and bull 20%. This resembles the base case because the bull's high operating income is offset by a meaningful bear probability. The asymmetry is important: the equity story may price a large autonomy option, but the segment model should not make that option the default without evidence of scaled FSD/Robotaxi revenue and margin.

11. Key Risks and Wildcards

Bear risk - vehicle commoditization. The segment's largest line is still vehicle sales. If BYD and other Chinese OEMs keep exporting lower-cost models, and if U.S. and European incumbents continue improving EV portfolios, Tesla may have to choose between volume and gross margin. The FY2023-FY2025 automotive sales decline already shows that scale alone does not prevent revenue pressure [data_package Section 4, Automotive sales row].

Bear risk - regulatory credit cliff. Regulatory credits were $1.993B in FY2025 and represented a meaningful portion of consolidated profitability [data_package Section 4, regulatory credits row; data_package Section 2 consolidated operating income]. EPA's 2026 final-rule action increases the probability that U.S. credit economics shrink, even if state and non-U.S. programs remain. The bear case assumes this line falls below $1B by 2031.

Bear/base risk - capex and opex intensity. Management's Q1 2026 commentary includes an expectation for more than $25B of 2026 capex [data_package Section 6, AI/capex commentary]. Automotive, Cybercab, Semi, battery, AI compute, and Optimus are all capital-hungry. Segment operating income can improve while free cash flow disappoints if the business needs continuous factory and compute investment to sustain growth.

Bear/base risk - autonomy timing. FSD paid-customer growth is encouraging, but the data package provides no separate FSD revenue line and no numeric Robotaxi revenue. If regulators, safety incidents, hardware limitations, or customer trust slow deployment, services and other can keep growing without delivering the margin expansion needed for the bull case.

Bear risk - leasing residuals and used vehicles. Tesla's direct pricing changes can damage used-vehicle values. Leasing revenue is small, but residual losses can affect reported margin and customer perception. Used vehicles inside services and other may also dilute margin if resale values weaken.

Base/bull wildcard - FSD as an attach-rate business. If nearly 1.3M paid FSD customers as of Q1 2026 continue growing and subscriptions become a durable, low-churn product, the services and other line can outgrow vehicle units. This is the main reason the base case gives services and other an 11% CAGR despite total segment history being negative.

Bull wildcard - Cybercab changes unit economics. Cybercab can matter in two ways: it can add a lower-cost vehicle platform, and it can support Robotaxi revenue. Management says production has started, but early output is not proof of economics. The bull case assumes Cybercab helps both hardware revenue and services monetization by 2031; the base case assumes a contribution but not a full platform transition.

Bull wildcard - Optimus. Optimus is potentially large but outside the evidenced segment model. The data package includes management's statement that Optimus could be Tesla's biggest product, but it also says Optimus has no revenue line and production timing/rate is uncertain [data_package Section 4, operational-disclosure table; data_package Section 6, AI/Optimus commentary]. This appendix assigns no explicit base-case Optimus revenue. It is upside option value, not a modeled automotive/services line.

Case	Segment TTM+5y Revenue	Segment TTM+5y Op Margin	Segment TTM+5y Op Income	Probability
Bear	$78.125B	2.0%	$1.562B	30%
Base	$104.986B	8.0%	$8.399B	50%
Bull	$140.021B	14.0%	$19.603B	20%

Source Appendix

Primary internal sources:

- `data_package.md` Section 1: reporting structure and taxonomy.
- `data_package.md` Section 3: segment historical revenue, gross profit, and gross margin.
- `data_package.md` Section 4: product/sub-segment historicals and operational-disclosure caveats.
- `data_package.md` Section 5: recent quarterly trend and TTM product revenue.
- `data_package.md` Section 6: management commentary on automotive, autonomy, services, AI, Optimus, and capex.
- `quant_foundation.md` P2 and P4: TTM segment revenue, gross profit, and official TTM construction.

Live external clarifications:

- Tesla Q1 2026 Exhibit 99.1 financial summary: https://www.sec.gov/Archives/edgar/data/1318605/000162828026026551/exhibit991.htm
- Tesla Q1 2026 production and deliveries: https://ir.tesla.com/press-release/tesla-first-quarter-2026-production-deliveries-and-deployments
- IEA Global EV Outlook 2025 electric-car market trends: https://www.iea.org/reports/global-ev-outlook-2025/trends-in-electric-car-markets-2
- Cox Automotive 2025 U.S. EV sales review: https://www.coxautoinc.com/insights/q4-2025-ev-sales-report-commentary/
- EPA February 2026 vehicle GHG final-rule page: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-rescission-greenhouse-gas-endangerment

Appendix B2 - Energy Generation and Storage

Energy generation and storage - Segment Deep Dive

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Data Source Rule included and obeyed: live fetches only; do not use local data warehouse caches. Read the DR-cleared data package for historicals and management commentary; only fetch live official/FMP sources for clarifications, never cached warehouse files.

Stage 0 time anchor used verbatim:

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

0. Segment boundary and taxonomy note

Tesla's Energy generation and storage reportable segment includes sales, leasing and financing of solar energy generation and energy storage products and related services. The data package found the reporting structure stable across FY2023-FY2025 and found no segment realignment, reclassification 8-K, or restated segment boundary in the live SEC submissions pull for the last fiscal-year boundary [data_package section 1, taxonomy investigation result]. The important boundary caveat is not restatement risk; it is disclosure granularity. Tesla discloses Energy generation and storage revenue, cost of revenue and gross profit, but it does not disclose segment operating income, nor does it disclose historical Megapack, Powerwall, Solar Roof or solar-panel revenue as separate dollar lines [data_package section 3, Energy row; data_package section 4, Energy product row; quant_foundation P2]. This appendix therefore treats Energy generation and storage as the only dollar-disclosed product line for historical and forward rollup purposes, while analyzing Megapack, Powerwall and solar qualitatively and through disclosed storage-deployment KPIs where the data package provides them.

1. What this segment actually is

Tesla Energy sells storage and solar hardware plus related services to utilities, grid operators, commercial and industrial customers, homeowners, solar installers and, in some cases, financing or lease customers. The economic center of gravity is storage, not solar. Megapack is the utility-scale and large commercial battery system. It is sold into grid-scale battery energy storage systems that arbitrage power prices, provide peak capacity, support renewables interconnection, help defer transmission upgrades, and supply ancillary grid services. Powerwall is the residential battery product sold to homeowners and through installers, usually paired with rooftop solar or purchased as a backup and self-consumption product. Solar Roof and retrofit solar-panel systems are the generation side of the segment, but the data package makes clear that Tesla does not separately disclose solar revenue or recent solar deployment dollars; Energy revenue is one line and storage GWh is the main operational KPI [data_package section 4, "Energy | Megapack / Powerwall / Megablock" KPI row].

The commercial model differs by product. Megapack is a project product: customers buy a large amount of energy capacity, accept a multi-quarter project schedule, and often purchase engineering, controls and maintenance around the hardware. For these projects, Tesla is not merely selling cells in boxes. It is selling an integrated battery system with power electronics, thermal management, battery management software, controls, site design, commissioning and long-lived service obligations. That integration is why Tesla can earn higher gross margins than a pure commodity-cell reseller when capacity is tight and the product reduces project execution risk. The same integration also exposes Tesla to lumpiness: a project can slip from one quarter to the next, producing volatile quarterly Energy revenue even when full-year demand is healthy. The data package shows the pattern rather than a smooth run rate: storage deployed was 9.6 GWh in Q2 2025, 12.5 GWh in Q3 2025, 14.2 GWh in Q4 2025 and 8.8 GWh in Q1 2026 [data_package section 4, Energy KPI row].

Powerwall is a smaller-ticket distributed storage product. The customer problem is different: outage protection, higher self-consumption of rooftop solar, time-of-use bill optimization and, where local programs permit it, virtual power plant aggregation. The margin drivers are therefore channel efficiency, installer economics, attach rates to solar, software aggregation and support costs. The residential product has more installation-channel complexity than a factory-delivered Megapack, but it also can create a networked fleet with recurring grid-service revenue if Tesla can aggregate Powerwalls into dispatchable capacity. The disclosed historical record does not allow us to separate that opportunity from the Energy segment's revenue base.

Solar is the weakest disclosed leg. Tesla inherited a large residential solar business from SolarCity, but in the current reporting package solar is not separately dollar-disclosed and no recent solar megawatt table is provided in the DR-cleared data package. Industry context matters because residential solar in the United States has been pressured by high financing rates, California net-metering changes and policy uncertainty. SEIA's Q2 2025 market report said the U.S. residential solar market added 1,106 MWdc in Q1 2025, down 13% year over year, while SEIA/Wood Mackenzie later described 2025 as a year of broad solar-policy and demand turbulence. That is consistent with modeling Tesla solar as strategically useful for Powerwall attachment but not as the primary growth engine.

2. Current economics

The current economic base is strong but unusually lumpy. Energy generation and storage revenue was $12.771B in FY2025, up 26.6% from $10.086B in FY2024 and up from $6.035B in FY2023. Gross profit was $3.802B in FY2025 and gross margin was 29.8% [data_package section 3, Energy generation and storage table]. On the TTM anchor ending March 31, 2026, Energy revenue was $12.449B and disclosed segment gross profit was $3.969B, implying 31.9% TTM gross margin [quant_foundation P2, TTM Energy row]. TTM Energy revenue was 12.7% of consolidated TTM revenue of $97.879B [quant_foundation P4].

The last four quarters show why this segment should not be modeled mechanically from one quarter. Energy revenue was $2.789B in Q2 2025, $3.415B in Q3 2025, $3.837B in Q4 2025 and $2.408B in Q1 2026 [quant_foundation P1C]. The Q1 2026 official update showed Energy revenue down 12% year over year, even while management said full-year 2026 deployments should exceed 2025 deployments [data_package section 5; data_package section 6, Q1 FY2026 CFO quote]. In other words, the TTM base is still a useful anchor, but the first quarter of the forward period starts below the late-2025 run rate.

No product share is disclosed. The data package states that Megapack, Powerwall, Solar Roof and related energy products/services are included in the single Energy generation and storage dollar line, and that Tesla does not separately disclose Megapack or Powerwall dollars [data_package section 4, dollar-disclosed product row; data_package section 10, gap 3]. The operational evidence points to storage as the main driver: Tesla disclosed storage deployments by quarter, and management commentary focuses on Megapack, Powerwall, Megablock and Megapack 3, not solar-panel volume [data_package section 4, Energy KPI row; data_package section 6, Energy generation and storage quotes].

Capital intensity is real. Tesla's consolidated capex was $8.5B in FY2025, and Q1 2026 management guided to more than $25B of 2026 capex at the company level [data_package section 7; data_package section 6, Q1 FY2026 capex quote]. The data package also flags a presentation change beginning Q1 2025: Tesla update decks present capex inclusive of purchases of energy generation and storage systems with prior periods adjusted [data_package section 7, capital-allocation read-through; data_package section 10, gap 7]. For Energy specifically, reinvestment is not just maintenance capex. It includes Megapack manufacturing capacity, battery pack capacity, supply-chain localization, product engineering, inventory and working capital tied to large projects, and field-service infrastructure.

The best current-profitability read is disclosed gross margin, not operating margin. Tesla does not disclose segment operating income [data_package section 3; quant_foundation P2]. For forecast rollup, this appendix models an allocated segment operating margin after deducting Energy-attributable R&D, sales, service, warranty, commissioning, software, project-management and administrative costs from disclosed gross profit. That is an analytical allocation, not a reported historical fact. The current modeled TTM operating margin used as a reference point is approximately 22%, equal to 31.9% disclosed TTM gross margin less about 10 percentage points of allocated segment opex. This is deliberately below gross margin and consistent with the fact that Tesla's consolidated operating margin was only 5.0% on the same TTM window [quant_foundation P4].

3. Unit economics

Energy revenue becomes profit through four layers: cell and pack cost, balance-of-system cost, factory throughput, and project execution. The cell/pack layer is the largest hardware cost and is the most exposed to lithium, LFP cathode, separator, electrolyte, cell-supply and tariff swings. The balance-of-system layer includes inverters, transformers, switchgear, thermal systems, cabinets, wiring, safety systems and controls. The factory-throughput layer determines how fixed labor, tooling and overhead are absorbed. The project-execution layer determines whether Tesla captures integration economics or loses margin to field work, delays, warranty reserves, penalties and service costs.

The historical gross-margin progression shows how much scale changed the segment. Energy gross margin moved from -4.6% in FY2021 to 7.4% in FY2022, 18.9% in FY2023, 26.2% in FY2024 and 29.8% in FY2025 [data_package section 3, Energy generation and storage table]. On the TTM anchor, gross margin improved further to 31.9% [quant_foundation P2]. That improvement is not normal for a commodity hardware business. It suggests that factory scale, mix shift toward Megapack, better utilization, product standardization and favorable pricing carried more weight than raw input deflation alone.

The margin question from here is whether FY2025/TTM gross margin is a ceiling, a plateau or a mid-cycle level. The bullish interpretation is that Megapack 3 and Megablock reduce on-site engineering cost, compress installation schedules and increase energy density, allowing Tesla to keep a premium price while lowering total delivered cost. Tesla's live official Megafactory page describes Lathrop as capable of producing 10,000 Megapack units per year, equal to 40 GWh of storage capacity. Tesla's Q1 2026 filing/update material also says Megapack 3 and Megablock are next-generation industrial storage products and that Megapack 3 production is scheduled for 2026 [Tesla Megafactory official page; Tesla Q1 2026 10-Q/update source cited in data_package section 5]. If the new products reduce field labor and project risk, gross margins can remain high even if price per kWh declines.

The bearish interpretation is that Tesla's margin structure is temporarily flattered by backlog, supply tightness and a mix of high-margin projects. The data package quotes CFO Vaibhav Taneja on the Q4 FY2025 call: "we expect margin compression from the increased low-cost competition impacts to market from policy uncertainty, and the cost of tariffs" [data_package section 6, Q4 FY2025 CFO quote]. That is directly relevant to unit economics. If Chinese integrators, cell suppliers and inverter companies push turnkey BESS prices lower, Tesla must either match price, lose share, or offset the pressure through faster deployment and better total cost of ownership.

Powerwall unit economics are less visible. The product likely has strong hardware brand value and software value, but residential installation is fragmented and heavily dependent on local permitting, financing, utility interconnection and installer execution. Solar unit economics are even more exposed to customer-acquisition cost and financing rates. Because the data package gives no separate Powerwall or solar dollars, the forecast does not assign separate margins. The practical assumption is that the segment's margin is increasingly set by utility-scale storage mix. Powerwall and solar matter for brand, distributed-grid optionality and attach rate, but they are not modeled as independent disclosed profit pools.

Reinvestment needs are high. Tesla's consolidated capex guide of more than $25B for 2026 includes large AI, vehicle and manufacturing plans, but Energy also needs battery pack capacity. Management said on the Q1 FY2026 call that "Our biggest limiter continues to be our battery pack capacity, and we are actively working on resolving that" [data_package section 6, Q1 FY2026 CFO quote]. That constraint matters because Energy growth is not only demand-led; it is capacity-led. If cells, packs or factory lines bottleneck, revenue recognition slips. If capacity is added too quickly into a lower-price market, margin compresses.

4. Competitive dynamics

Megapack competes in a global BESS integration market that is growing quickly but becoming more competitive. The direct competitors include Sungrow, Fluence, CRRC Zhuzhou Institute, HyperStrong, BYD, CATL-backed systems, Huawei, Wärtsilä, Powin-type integrators, and utility/EPC-led in-house integrations. The competitive set is not limited to battery makers. A customer buying a 100 MW or 1 GWh storage project is buying cells, racks, power conversion, thermal management, controls, warranties, safety certifications, commissioning and long-term service. Tesla's competition therefore comes from both vertically integrated battery firms and system integrators with strong project-delivery reputations.

Market-share evidence supports a leadership position but not a monopoly. Wood Mackenzie reported that in 2022 the top five global BESS integrators had 62% of shipments, with Sungrow at 16%, Fluence at 14%, Tesla at 14%, Huawei at 9% and BYD at 9%. More recent industry reporting from InfoLink and energy-storage trade sources described Tesla, Sungrow, CRRC, Fluence and HyperStrong as the leading 2024 BESS integrators, with Tesla leading on the AC-side ranking in 2024 while Sungrow closed the gap. The useful conclusion is not the exact share point; it is that the market is concentrated enough for bankable vendors to earn a premium, but competitive enough that no vendor can assume permanent pricing power.

The demand backdrop is structurally favorable. EIA expected 18.2 GW of utility-scale battery storage to be added to the U.S. grid in 2025, a record level, and expected solar plus battery storage to dominate new U.S. electric-generating capacity additions. IEA describes battery storage as the fastest-growing clean energy technology in the power sector and emphasizes its role in balancing renewables, providing grid services and deferring network investment. This is the core demand argument for Tesla Energy: grid storage is becoming an infrastructure category rather than a niche renewable accessory.

Pricing power is strongest where customers value bankability, project certainty and integrated controls more than lowest upfront price. Utilities, hyperscale data-center developers and IPPs often care about cycle life, warranty enforceability, safety track record, interconnection compliance, software controls, installation timeline and the balance sheet behind the warranty. Tesla can price for that bundle when supply is tight and its product shortens deployment. Pricing power is weakest in China and other markets where low-cost local integrators can bundle domestic cells, inverters and EPC relationships at aggressive prices. Tariffs can help or hurt depending on geography: they may protect localized U.S. supply, but they also raise input costs and complicate cross-border sourcing.

Powerwall's competition is different: Enphase, SolarEdge, FranklinWH, Generac, LG Energy Solution, BYD, Sonnen and installer-branded solutions. Here, the issue is less one-off project bankability and more installer economics, financing, app experience, solar attach rate, virtual power plant programs and local service. Tesla's brand and software are advantages, but the installer channel is not as vertically controlled as vehicle retail, and many homeowners buy through solar installers rather than directly from Tesla.

Solar is the least advantaged competitive arena. Tesla faces commodity panel suppliers, specialized residential installers, local electrical contractors and financing-heavy solar platforms. The U.S. residential solar market has been cyclical and policy-sensitive, with SEIA/Wood Mackenzie data showing residential weakness in 2024 and continued pressure in parts of 2025. This appendix therefore treats solar as an attachment and ecosystem product, not as a stand-alone source of durable excess returns.

5. Moat at the segment level

The segment has a partial moat, not an impregnable one. Tesla's moat in Energy comes from productization, manufacturing scale, software integration, bankability, brand, installed base and project experience. Megapack is closer to an industrial product platform than a bespoke EPC solution. If Megapack 3 and Megablock reduce custom engineering and field construction, Tesla can turn grid storage into a repeatable manufactured product. That reduces customer risk and can protect margin.

Manufacturing scale is an advantage because BESS customers increasingly want large projects delivered on predictable timelines. A supplier with 40 GWh-class factory capacity, a global customer reference base and standardized commissioning can win projects that a smaller integrator cannot finance, insure or warranty as easily. Tesla's official Lathrop Megafactory page says the site can produce 10,000 Megapack units per year, equal to 40 GWh of clean energy storage. The DR-cleared package separately supports Houston as a 2026 Megablock shipping catalyst; any additional regional capacity contribution should be treated as upside until verified through official filings.

Software is a second moat component. Controls, energy management, safety monitoring and remote dispatch affect project value over decades. Tesla's experience with vehicle battery management, Supercharger load management, virtual power plants and utility-scale controls gives it a credible software layer. However, this is not the same as a software monopoly. Fluence, Wärtsilä, Sungrow and other integrators also sell controls and optimization. The moat is strongest when hardware, software, warranty and manufacturing are bundled.

The weakest moat component is cell chemistry. Stationary storage does not require the same energy density as EVs; cost, durability, cycle life and safety matter more. That opens the market to LFP, sodium-ion, flow batteries and other chemistries over time. Tesla can buy or make cells, but it cannot assume exclusive access to the lowest-cost chemistry. If cells commoditize faster than Tesla's integration value grows, the margin pool shifts away from hardware assemblers.

Over five years, the moat should support above-average gross margin but not unlimited expansion. The base case assumes Tesla keeps a bankability and execution premium while the segment's disclosed gross margin settles below TTM peak levels because competition and tariffs offset scale. The bull case assumes Megapack 3 and Megablock convert productization into faster turns and lower field cost. The bear case assumes BESS becomes a price-led market where Tesla's premium compresses and solar/Powerwall cannot offset the decline.

6. Historical growth rates reproduced from data package

The historical table below uses the DR-cleared data package and quant foundation. Tesla does not disclose product-level Energy dollars below the single Energy generation and storage line; Megapack, Powerwall, Solar Roof and Megablock are therefore not separately shown as historical revenue lines. The "3-year CAGR" column is FY2022 to FY2025 because that is the most recent three-year compounding interval available in the five-year segment table.

Product / sub-segment	FY2022 rev	FY2023 rev	FY2024 rev	FY2025 rev	FY2022-FY2025 CAGR	Most recent YoY	Data package cite
Energy generation and storage	$3.909B	$6.035B	$10.086B	$12.771B	48.4%	26.6%	data_package section 3, Energy table revenue and YoY rows; data_package section 4, Energy dollar-disclosed product row
Megapack / Powerwall / Megablock	Not separately disclosed	Not separately disclosed	Not separately disclosed	Not separately disclosed	n/a	Storage deployed 8.8 GWh in Q1 2026 after 14.2 GWh in Q4 2025	data_package section 4, Energy KPI row; data_package section 10, gap 3
Solar Roof / solar panels and related solar services	Not separately disclosed	Not separately disclosed	Not separately disclosed	Not separately disclosed	n/a	Not separately disclosed	data_package section 4, Energy dollar-disclosed product row; data_package section 10, gap 3

Arithmetic tie-out: $3.909B x 1.544 = $6.035B, $6.035B x 1.671 = $10.086B, and $10.086B x 1.266 = $12.771B, each within rounding of the data package YoY rates [data_package section 3, Energy table]. The FY2022-FY2025 CAGR tie-out is ($12.771B / $3.909B)^(1/3) - 1 = 48.4%.

Recent quarterly trend from the data package and quant foundation:

Quarter	Energy revenue	Energy YoY	Storage deployments	Source
Q2 2025	$2.789B	-7%	9.6 GWh	data_package section 5; data_package section 4 Energy KPI row; quant_foundation P1C
Q3 2025	$3.415B	44%	12.5 GWh	data_package section 5; data_package section 4 Energy KPI row; quant_foundation P1C
Q4 2025	$3.837B	25%	14.2 GWh	data_package section 5; data_package section 4 Energy KPI row; quant_foundation P1C
Q1 2026	$2.408B	-12%	8.8 GWh	data_package section 5; data_package section 4 Energy KPI row; quant_foundation P1C

The TTM Energy revenue base is $12.449B, equal to Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 [quant_foundation P1C and P4]. The storage-deployment sum across those same four quarters is 45.1 GWh, implying a rough TTM revenue intensity of $276M per GWh at the segment level. That is not a product ASP because the segment includes Powerwall, solar and services, and because revenue recognition can diverge from physical deployments. It is still a useful reasonableness check: the forward model should not imply volume growth without capacity, nor revenue growth without recognizing price compression risk.

7. Management guidance quoted from data package

The data package's management commentary is the guidance anchor. I reproduce every Energy-relevant quote below and interpret it against the TTM base rather than treating it as a guarantee.

- Source: Q1 FY2026 call, April 22, 2026. Speaker: Elon Musk, CEO. Quote: "Demand for our Megapack is very strong, and we're excited to begin production of Megapack 3 later this year." [data_package section 6, Energy quote]. Interpretation: demand is not the near-term constraint in management's framing; product cycle and capacity are. The base case therefore keeps growth above the overall storage market in the first two forecast years before decelerating.

- Source: Q4 FY2025 call, January 28, 2026. Speaker: Elon Musk, CEO. Quote: "We are building more manufacturing capacity and expect that energy will have very high growth for as far into the future as we can imagine." [data_package

section 6, Energy quote]. Interpretation: management sees Energy as a long-duration growth business, but this is qualitative. The model translates it into a five-year base CAGR of 18.6%, materially below the FY2022-FY2025 CAGR because the revenue base is now much larger and competition is intensifying.

- Source: Q4 FY2025 call, January 28, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "we expect margin compression from the increased low-cost competition impacts to market from policy uncertainty, and the cost of tariffs." [data_package section 6, Energy quote]. Interpretation: this directly limits margin expansion. The base case assumes modeled operating margin falls modestly from the current allocation reference even though revenue grows.

- Source: Q3 FY2025 call, October 22, 2025. Speaker: Michael Snyder. Quote: "Demand for Megapack and Powerwall continues to be really strong into next year." [data_package section 6, Energy quote]. Interpretation: both utility-scale and residential storage had near-term backlog strength before Q1 2026's sequential deployment decline. This supports treating Q1 weakness as timing/lumpiness, not immediate demand collapse.

- Source: Q3 FY2025 call, October 22, 2025. Speaker: Michael Snyder. Quote: "Mega Block product, which will begin shipping next year out of Houston." [data_package section 6, Energy quote]. Interpretation: Megablock is a 2026 product and capacity catalyst, but the forecast assumes a ramp rather than immediate full contribution because new industrial products typically move through commissioning, customer validation and manufacturing learning curves.

- Source: Q2 FY2025 call, July 23, 2025. Speaker: Michael Snyder. Quote: "we are forecasting a very strong second half of the year as we increase deployments." [data_package section 6, Energy quote]. Interpretation: this proved directionally consistent with the Q3/Q4 deployment step-up to 12.5 GWh and 14.2 GWh. It increases confidence that management can deliver lumpy backlog into revenue when capacity is available.

- Source: Q1 FY2026 call, April 22, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "we still expect 2026 deployments to be higher than 2025." [data_package section 6, Energy quote]. Interpretation: despite Q1 2026 being down sequentially and Energy revenue down 12% year over year, management maintained full-year deployment growth. The base case uses a high first-year growth rate from the TTM base, but not a return to FY2024's 67% growth.

8. Forward growth assumptions

Because Tesla discloses only one Energy dollar line, the revenue rollup has one dollar-disclosed product line: Energy generation and storage. Megapack, Powerwall and solar are discussed as drivers inside that line. The model does not assign historical or forecast dollar shares to Megapack, Powerwall or solar because doing so would create a false precision not supported by the data package. The TTM base is $12.449B [quant_foundation P4]. The endpoint is March 31, 2031.

Base case growth

Product	3-year historical CAGR	Latest YoY	Mgmt FY+1 guide	Base CAGR TTM to TTM+5y	Justification
Energy generation and storage	48.4% FY2022-FY2025	Q1 2026 revenue -12% YoY; FY2025 +26.6%	2026 deployments expected higher than 2025; Megapack demand strong; Megapack 3 later in 2026	18.6%	Growth decelerates from the 48.4% historical CAGR because the base is now $12.449B TTM, competition is stronger and tariffs/policy uncertainty pressure pricing. It remains high because grid storage demand, the Lathrop Megafactory, Megapack 3/Megablock, the Houston shipping catalyst and Powerwall demand support volume growth.

Base year-by-year revenue bridge:

Period ending	Revenue	Growth	Main driver
TTM 2026-03-31	$12.449B	n/a	Actual TTM anchor
TTM+1	$15.188B	22%	2026 deployments higher than 2025; Q1 weakness partly timing

Period ending	Revenue	Growth	Main driver
TTM+2	$18.378B	21%	Megapack 3/Megablock ramp and capacity expansion
TTM+3	$21.870B	19%	larger base, still strong grid-storage demand
TTM+4	$25.588B	17%	price compression offsets volume growth
TTM+5 2031-03-31	$29.171B	14%	mature but still growing infrastructure category

The base path deliberately shows deceleration instead of applying the historical CAGR. A 48.4% CAGR for five more years would imply nearly $90B of Energy revenue, which would require Tesla to become a dominant global BESS supplier at enormous capacity while maintaining pricing. That is possible only in a very aggressive bull case, not in a base case. The 18.6% base CAGR more than doubles revenue over five years and keeps Tesla's Energy growth above consolidated Tesla growth, but it incorporates the CFO's margin and competition warning.

Bull case growth

Product	3-year historical CAGR	Latest YoY	Mgmt FY+1 guide	Bull CAGR TTM to TTM+5y	Justification
Energy generation and storage	48.4% FY2022-FY2025	Q1 2026 revenue -12% YoY; FY2025 +26.6%	Demand strong; 2026 deployments above 2025; Megapack 3/Megablock shipping from Houston	25.9%	Bull assumes Q1 2026 was mostly timing, Megapack 3 and Megablock materially reduce installed cost, Lathrop/Houston execution scales without major yield issues, and AI/data-center power demand pulls forward large storage orders. Growth still decelerates from the historical CAGR because the revenue base is larger.

Bull year-by-year revenue bridge:

Period ending	Revenue	Growth	Main driver
TTM 2026-03-31	$12.449B	n/a	Actual TTM anchor
TTM+1	$16.433B	32%	backlog conversion and strong second-half deployments
TTM+2	$21.199B	29%	Megapack 3/Megablock acceptance and factory ramp
TTM+3	$26.711B	26%	large utility and data-center projects, global expansion
TTM+4	$32.855B	23%	scale advantage persists despite competition
TTM+5 2031-03-31	$39.426B	20%	Energy becomes a major global infrastructure platform

The bull case is not simply "base but higher." It requires a different mechanism: Tesla's productized approach must lower total project cost faster than competitors lower hardware price. If Megablock reduces field work and commissioning time, Tesla can keep a premium while customers still see a lower all-in installed cost. Without that mechanism, the bull revenue path would likely come with much lower margins.

Bear case growth

Product	3-year historical CAGR	Latest YoY	Mgmt FY+1 guide	Bear CAGR TTM to TTM+5y	Justification
Energy generation and storage	48.4% FY2022-FY2025	Q1 2026 revenue -12% YoY; FY2025 +26.6%	2026 deployments expected above 2025, but margin compression warned	8.0%	Bear assumes battery pack capacity remains a bottleneck, low-cost Chinese and local integrators compress prices, tariffs raise costs, and residential solar/Powerwall softness limits mix support. Revenue still grows because storage demand is structural, but Tesla loses pricing and some share.

Bear year-by-year revenue bridge:

Period ending	Revenue	Growth	Main driver
TTM 2026-03-31	$12.449B	n/a	Actual TTM anchor
TTM+1	$13.943B	12%	management delivers some 2026 deployment growth
TTM+2	$15.198B	9%	price pressure offsets capacity growth
TTM+3	$16.414B	8%	competition and tariffs bite
TTM+4	$17.399B	6%	market growth slows or share slips
TTM+5 2031-03-31	$18.269B	5%	Energy becomes a lower-margin industrial hardware line

The bear case does not assume demand disappears. Grid storage demand is too structurally supported by renewables, load growth and grid reliability for a flat revenue case to be the central downside. The downside is that Tesla's revenue per GWh and margin per project fall faster than volume rises.

9. Forward operating margin assumptions

Tesla does not disclose Energy segment operating income. The only disclosed segment profitability metrics are gross profit and gross margin. FY2025 Energy gross margin was 29.8%; TTM Energy gross margin was 31.9% [data_package section 3, Energy table; quant_foundation P2]. This appendix therefore creates a modeled operating margin by subtracting allocated segment opex from disclosed gross profit. The allocation is not a historical disclosure and should be treated as a modeling construct for segment rollup.

Current modeled TTM operating margin reference:

Item	Amount / margin	Source or assumption
TTM Energy revenue	$12.449B	quant_foundation P4
TTM Energy gross profit	$3.969B	quant_foundation P2
TTM Energy gross margin	31.9%	quant_foundation P2
Allocated Energy opex assumption	about 10% of revenue	model allocation for R&D, SG&A, service, commissioning, warranty and support
Modeled TTM Energy operating margin	about 22%	analytical allocation, not disclosed

Base margin

The base case uses a TTM+5y modeled operating margin of 21.0%. That is about 100 bps below the current allocation reference and roughly 1,090 bps below disclosed TTM gross margin. The specific mechanism is mix and price pressure offset by scale. Megapack 3 and Megablock reduce field costs and keep factory utilization high, but the CFO's warning about low-cost competition, policy uncertainty and tariffs prevents margin expansion. The model assumes gross margin settles around the high-20s to low-30s and allocated opex remains near 8-10% of revenue as the segment scales.

Bull margin

The bull case uses a TTM+5y modeled operating margin of 25.0%. This requires Tesla to keep gross margin near the low-30s and reduce allocated opex as a percentage of revenue through standardized Megapack 3/Megablock deployment, higher factory utilization, software/control attach and fewer custom project costs. It also assumes supply-chain localization limits tariff damage and that customers continue paying for bankability and speed. The margin uplift is not from commodity cells; it is from productization and execution.

Bear margin

The bear case uses a TTM+5y modeled operating margin of 13.0%. This assumes gross margin compresses into the low-to-mid-20s as BESS pricing becomes more competitive, while opex does not fall enough because Tesla still must support warranties, service networks, project engineering and product development. The risk is not just lower ASP. It is lower ASP combined with slower factory absorption, tariff cost, warranty reserves or field rework.

Case	TTM gross margin anchor	TTM modeled operating margin reference	TTM+5y modeled operating margin	Margin mechanism
Bear	31.9%	about 22%	13.0%	BESS price compression, tariffs, slower utilization and higher service/warranty burden
Base	31.9%	about 22%	21.0%	scale offsets most but not all competition and tariff pressure
Bull	31.9%	about 22%	25.0%	Megapack 3/Megablock productization lowers installed cost and opex intensity

Because the operating margin is allocated, the margin cases should be used for consolidated model sensitivity, not as claims about reported segment EBIT. If the main ER2 synthesis wants to avoid segment-level opex allocation, it can instead carry Energy gross profit and allocate corporate opex at the company level. The revenue forecasts in this appendix remain valid under either method.

10. Segment rollup

The rollup is intentionally simple because Tesla's historical product-level Energy dollars are not disclosed. The only forecasted dollar line is Energy generation and storage. Megapack, Powerwall, Megablock and solar are the drivers inside the line, not separate historical revenue pools.

Case	TTM revenue base	TTM to TTM+5y CAGR	TTM+5y revenue	TTM+5y modeled op margin	TTM+5y modeled op income	Probability
Bear	$12.449B	8.0%	$18.269B	13.0%	$2.375B	25%
Base	$12.449B	18.6%	$29.171B	21.0%	$6.126B	50%
Bull	$12.449B	25.9%	$39.426B	25.0%	$9.857B	25%

Arithmetic check: each case uses revenue from the section 8 year-by-year bridge and operating income equals revenue multiplied by modeled operating margin. Bear: $18.269B x 13.0% = $2.375B. Base: $29.171B x 21.0% = $6.126B. Bull: $39.426B x 25.0% = $9.857B. Because there is only one dollar-disclosed product line, product-level revenue sums to segment revenue exactly.

Probability-weighted outcome: (25% x $18.269B) + (50% x $29.171B) + (25% x $39.426B) = $29.009B of TTM+5y Energy revenue. Probability-weighted modeled operating income is (25% x $2.375B) + (50% x $6.126B) + (25% x $9.857B) = $6.121B. The 50% base weight reflects strong management demand commentary and favorable storage-market structure, tempered by the Q1 2026 revenue decline, battery-pack bottleneck and CFO margin-compression warning; equal 25% tails keep the upside/downside levers visible without treating either as the central case.

Relative to Tesla's FY2025 Energy revenue of $12.771B, the base endpoint implies the segment grows by 2.3x over approximately five years from the TTM anchor. That is a significant contribution to consolidated profit even if Automotive remains the larger revenue segment. The model's most important sensitivity is not whether Energy grows; it is whether Energy can keep operating-margin economics above a typical industrial hardware supplier as the BESS market scales.

11. Key risks and wildcards

- Bear - price compression and commoditization. The CFO's Q4 FY2025 quote on low-cost competition, policy uncertainty and tariffs is the central risk. If turnkey BESS becomes a procurement-led, lowest-price market, Tesla's integration premium narrows and the bear margin case becomes more likely.

- Bear - battery pack and cell bottlenecks. Management said battery pack capacity remains the biggest limiter [data_package section 6, Q1 FY2026 CFO quote]. If Tesla cannot secure enough LFP/prismatic cell supply or pack capacity, revenue recognition slips even when backlog is healthy.

- Bear/base - tariffs and localization. Tariffs can raise input costs and reduce project returns. Localized manufacturing can help, but only if it ramps with competitive cost and quality. Tariff-driven margin pressure is a direct mechanism in the base and bear margin cases.

- Base - deployment lumpiness. The last four quarters show Energy revenue moving from $2.789B to $3.837B and then down to $2.408B [quant_foundation P1C]. Quarterly misses should not be over-interpreted, but repeated slippage would signal execution risk rather than mere timing.

- Bull - Megapack 3 and Megablock productization. If the new products materially reduce engineering, installation and commissioning time, Tesla can gain share while preserving margin. This is the cleanest path to the bull case.

- Bull - AI and data-center power demand. Hyperscale load growth, grid bottlenecks and the need for fast interconnection can increase demand for standardized storage blocks. Tesla could benefit if Megablock becomes a default product for fast power nodes.

- Bear - solar and residential-channel weakness. Residential solar demand has been pressured by rates and policy changes. If Powerwall attachment is tied to weak solar installations, distributed storage underperforms even while utility storage grows.

- Bear/base - warranty, fire-safety or field-quality events. A major BESS incident can create direct warranty cost, reputational damage, higher insurance requirements and slower permitting. The impact would be disproportionate because bankability is a core part of Tesla's Energy moat.

Summary table

Case	Segment TTM+5y Revenue	Segment TTM+5y Op Margin	Segment TTM+5y Op Income	Probability
Bear	$18.269B	13.0%	$2.375B	25%
Base	$29.171B	21.0%	$6.126B	50%
Bull	$39.426B	25.0%	$9.857B	25%

Source notes

Primary Tesla historicals and management quotes are from `data_package.md` and `quant_foundation.md`, which were DR-cleared and live-fetched under the ER2 data-source rule. Additional live context used only for competitive and market clarification: Tesla official Megafactory page, https://www.tesla.com/megafactory; EIA Today in Energy, "Solar, battery storage to lead new U.S. generating capacity additions in 2025," https://www.eia.gov/todayinenergy/detail.php?id=64586; IEA, "Batteries and Secure Energy Transitions," https://www.iea.org/reports/batteries-and-secure-energy-transitions; Wood Mackenzie, "Global energy storage integrator market grows increasingly competitive in 2022," https://www.woodmac.com/press-releases/global-energy-storage-integrator-market-grows--increasingly-competitive-in-2022/; SEIA Solar Market Insight Q2 2025, https://seia.org/research-resources/solar-market-insight-report-q2-2025/. No local data warehouse cache was used.

Data gaps preserved

[DATA GAP: Tesla does not disclose Energy generation and storage segment operating income; this appendix uses modeled operating margin after allocated opex.]

[DATA GAP: Tesla does not disclose Megapack, Powerwall, Megablock, Solar Roof or solar-panel historical revenue dollars separately; this appendix does not create historical or forecast dollar splits below the Energy segment line.]

[DATA GAP: Tesla does not disclose product-level Energy gross margin or operating margin by Megapack, Powerwall or solar; margin cases are segment-level modeling assumptions.]

Appendix S - Synthesis (Combined Earnings Model)

Tesla, Inc. - Synthesis (Combined Earnings Model)

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1. Anchors

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

The latest completed FY label used only for historical tie-out is FY2025. The forward model does not anchor from FY2025. It starts from the TTM ending March 31, 2026 and compounds exactly five calendar years to March 31, 2031. Current price for the P/E 15 gate is $377.56, from the live quote checked during this Synthesis run on 2026-04-28 Singapore time. The TTM diluted weighted average share count is 3,538 million, from the Q1 2026 official balance sheet/share-count tie in the quant foundation P6.

The controlled source set for historicals and segment forecasts is the DR-cleared data package, the 8/8 quant foundation, and the two R-reviewed segment appendices. I did not use local warehouse caches. I used a live price only because the P/E 15 gate requires today's share price. Segment operating income is not disclosed by Tesla. Therefore, every segment OI number in this appendix is a modeled allocation from the R-reviewed segment appendices, not a reported Tesla segment line. That distinction matters because a clean-looking operating-income sum would otherwise overstate precision.

2. Segment-level forward assumptions

Segment	TTM revenue ($B)	Bear TTM+5y revenue ($B)	Base TTM+5y revenue ($B)	Bull TTM+5y revenue ($B)	Bear OI margin	Base OI margin	Bull OI margin	Source
Automotive and services/other	85.430	78.125	104.986	140.021	2.0%	8.0%	14.0%	appendix_B_automotive_services_other.md sections 8-10
Energy generation and storage	12.449	18.269	29.171	39.426	13.0%	21.0%	25.0%	appendix_B_energy_generation_storage.md sections 8-10
Total reportable segment revenue	97.879	96.394	134.157	179.447	n/a	n/a	n/a	QF P4 plus segment appendices

The automotive/services appendix starts from $85.430B of official TTM reportable-segment revenue. That total includes $71.793B of automotive revenue and $13.637B of services and other revenue. Within automotive revenue, the appendix estimates sales, leasing, and regulatory-credit TTM starting points by applying FY2025 mix to the official TTM automotive revenue total. That is a forecast allocation, not a reported quarterly sub-line. The appendix then models automotive sales, leasing, regulatory credits, and services/other to March 31, 2031. The base case reaches $104.986B of segment revenue and $8.399B of modeled segment OI. The bear case reaches $78.125B and $1.562B of OI. The bull case reaches $140.021B and $19.603B of OI.

The Energy appendix is simpler because Tesla discloses Energy generation and storage as one dollar line. It starts from $12.449B of TTM revenue and $3.969B of TTM gross profit. Because Tesla does not disclose Megapack, Powerwall, Megablock, solar, or services dollars separately, the Energy rollup uses one product line and one modeled segment margin. Base Energy revenue reaches $29.171B at a 21.0% modeled operating margin, or $6.126B of OI. Bear reaches $18.269B at a 13.0% margin, or $2.375B of OI. Bull reaches $39.426B at a 25.0% margin, or $9.857B of OI.

The important modeling discipline is that AI, Robotaxi, FSD, Cybercab, Semi, and Optimus are not inserted as separate disclosed historical revenue streams. The automotive/services appendix allows some services, fleet, and autonomy benefit through the services and other line and through margin assumptions, but it does not back-solve a standalone Robotaxi or Optimus revenue line from management aspiration. This Synthesis preserves that treatment. Undisclosed economics remain optionality, not base-case proof.

3. Combined revenue build by case

Line	Bear	Base	Bull
Automotive and services/other TTM+5y revenue	$78.125B	$104.986B	$140.021B
Energy generation and storage TTM+5y revenue	$18.269B	$29.171B	$39.426B
Sum of segment TTM+5y revenue	$96.394B	$134.157B	$179.447B
Corporate eliminations / residual revenue	$0.000B	$0.000B	$0.000B
Combined TTM+5y revenue	$96.394B	$134.157B	$179.447B
Implied TTM to TTM+5y CAGR	-0.3%	6.5%	12.9%

The revenue build ties exactly to the two reportable segments because Tesla's reportable segment revenue ties to consolidated revenue in the quant foundation. QF P2 and P4 show TTM Automotive and services/other revenue of $85.430B plus Energy revenue of $12.449B, which equals TTM consolidated revenue of $97.879B. There is no third revenue segment and no corporate revenue residual in the controlled source.

The bear case is not a collapse case. It assumes the core vehicle franchise remains large but does not reaccelerate, while Energy grows at a slower industrial rate. Combined revenue is $96.394B, slightly below the TTM base. That is consistent with an auto business still under price pressure and an Energy business growing from a smaller base but not large enough to offset all core weakness.

The base case assumes Tesla gets moderate consolidated growth, not hypergrowth. Automotive/services grows from $85.430B to $104.986B, a 4.2% segment CAGR. Energy grows from $12.449B to $29.171B, an 18.6% segment CAGR. The combined company grows to $134.157B, a 6.5% CAGR. That is already a meaningful recovery from the FY2025 decline, but it is still anchored in disclosed revenue lines rather than adding a large separate robotaxi revenue pool.

The bull case is explicitly not the underwritten case for the Gideon price gate. It gives Tesla credit for a much stronger autonomy/services mix and Energy scaling path. Combined revenue reaches $179.447B, a 12.9% CAGR. Even so, as shown below, the bull case remains far below the EPS required for the stock to clear a P/E 15 test at the current price.

4. Combined operating income build by case

Line	Bear	Base	Bull
Automotive and services/other modeled OI	$1.562B	$8.399B	$19.603B
Energy generation and storage modeled OI	$2.375B	$6.126B	$9.857B
Sum of modeled segment OI	$3.937B	$14.525B	$29.460B
Unallocated corporate / calibration expense	($1.554B)	($1.511B)	($1.405B)
Combined TTM+5y OI	$2.383B	$13.014B	$28.055B
Implied OI margin	2.5%	9.7%	15.6%

Tesla does not disclose segment operating income. The segment appendices necessarily allocate operating expense to reportable segments. When their modeled TTM operating contributions are compared to consolidated reported TTM operating income, there is a residual. The automotive/services appendix estimates current segment operating contribution at about $3.4B, or roughly 4.0% of revenue. The Energy appendix estimates current Energy operating contribution at about 22% of $12.449B, or about $2.739B. Those two modeled TTM contributions sum to about $6.139B, while QF P4 shows consolidated TTM operating income of $4.897B. The difference is $1.242B. I treat this as an unallocated corporate / calibration expense,

not as value to be ignored.

For the horizon model, I grow that $1.242B residual to reflect continuing AI, autonomy, corporate, and governance overhead. The bear case uses $1.554B, roughly a 4.6% annual growth rate. The base case uses $1.511B, roughly 4.0% annually. The bull case uses $1.405B, roughly 2.5% annually, because stronger scale absorption should reduce the residual as a percent of sales. This line is deliberately conservative. It avoids double-counting unproven AI economics as high-margin revenue while leaving the cost of AI, Robotaxi, chips, and corporate infrastructure visible in the consolidated model.

The base case OI margin of 9.7% is a real improvement from the 5.0% TTM consolidated margin. It requires two things to be true at the same time: automotive/services margin must recover from the modeled current 4.0% area to 8.0%, and Energy must defend a 21.0% operating margin despite low-cost competition, tariffs, and battery-pack constraints. The model does not require the bull case's 15.6% consolidated margin, but it does require Tesla to return to a materially better operating profile than the recent TTM. That is not a trivial assumption.

5. Net income and EPS build by case

Line	Bear	Base	Bull
Combined TTM+5y OI	$2.383B	$13.014B	$28.055B
Net interest / other income	$0.400B	$0.800B	$1.200B
Pre-tax income	$2.783B	$13.814B	$29.255B
Tax rate assumed	18.0%	20.0%	21.0%
Net income	$2.282B	$11.051B	$23.111B
Diluted share count at TTM+5y	3,592.6M	3,592.6M	3,592.6M
EPS at TTM+5y	$0.64	$3.08	$6.43

The net interest / other line is positive because Tesla has a net cash and short-term investment position. The Q1 2026 balance sheet in QF P6 shows $44.743B of cash, cash equivalents, and short-term investments against $9.229B of total debt and finance leases. I still keep the line modest. The bear case uses $0.400B, base $0.800B, and bull $1.200B. The range allows for cash yield but does not rely on financial income to rescue the operating model.

The tax assumptions are also intentionally normal rather than optimized. Tesla's historical tax rate can be distorted by credits, jurisdiction mix, and discrete items. For a five-year-forward valuation test, the model uses 18.0% in bear, 20.0% in base, and 21.0% in bull. The bull case does not receive a lower tax rate because it already receives stronger operating leverage. Base net income is therefore $11.051B, calculated as $13.814B of pre-tax income multiplied by 80.0%.

The EPS line is the decisive result. Base-case EPS of $3.08 is far below the $25.17 required for the stock to trade at 15 times TTM+5y EPS at the current price. Even bull-case EPS of $6.43 is far below the required level. That means the P/E 15 gate fails before any qualitative debate about whether Tesla is a good company. The valuation required by today's price is not a moderate recovery; it requires an earnings level that is not produced by the controlled segment models.

6. Share count path

Year	Starting share count (M)	Buyback $ ($B)	Avg price assumed	Shares retired (M)	SBC issuance (M)	Ending share count (M)
TTM base, 2026-03-31	3,538.0	n/a	n/a	n/a	n/a	3,538.0
Year 1	3,538.0	$0.0	n/a	0.0	10.9	3,548.9
Year 2	3,548.9	$0.0	n/a	0.0	10.9	3,559.8
Year 3	3,559.8	$0.0	n/a	0.0	10.9	3,570.7
Year 4	3,570.7	$0.0	n/a	0.0	10.9	3,581.6
Year 5	3,581.6	$0.0	n/a	0.0	10.9	3,592.6

The data package is clear that Tesla has not paid common dividends or executed material common-stock buybacks over FY2021-FY2025, and the management appendix characterizes Tesla's capital allocation as internally funded growth rather than capital return. The Q1 2026 commentary also raised expected 2026 capex to more than $25B. Therefore, the base model assumes no buybacks. That is consistent with the observed capital-allocation record and with the forward capex burden.

For SBC issuance, the data package gives Q1 2026 stock-based compensation of $1.030B. Because a full TTM SBC line is not separately supplied in the controlled source, I annualize Q1 at $4.120B and divide by the current price of $377.56 to estimate 10.9 million shares per year. This is a simplifying approximation, and the actual number could be higher or lower depending on award mix, grant-date value, vesting, the CEO Performance Award, and stock price. It is enough to prevent the model from assuming buybacks-maintain-EPS without proof. The resulting horizon share count is 3,592.6M.

This share-count path is not the main reason the P/E gate fails. Holding shares flat at 3,538M would lift base EPS only modestly, from $3.08 to about $3.12. The gate fails because the current price requires $25.17 of FY+5 EPS, not because of a small share-count difference.

7. P/E 15 test

Case	EPS at TTM+5y	EPS x 15	Current price	Cushion	Pass?
Bear	$0.64	$9.53	$377.56	-97.5%	Fail
Base	$3.08	$46.14	$377.56	-87.8%	Fail
Bull	$6.43	$96.50	$377.56	-74.4%	Fail

Required FY+5 EPS for P/E 15 at today's price is $25.17, calculated as $377.56 divided by 15. The base-case cushion is -87.8%, calculated as ($46.14 minus $377.56) divided by $377.56. The bull-case cushion is also deeply negative. This is not a borderline WATCH on price. It is a P/E 15 gate fail.

The confident case that matters is the base case. A business can have a plausible bull case and still fail the Gideon price discipline if the base case does not reach the required earnings power. Here, base-case EPS would have to be 8.2 times higher than the modeled $3.08 to clear the gate. That gap is too large to bridge with rounding, tax assumptions, interest income, or a slightly different share-count path. It would require a fundamentally different segment model, most likely a large, high-margin autonomous network, software, or robotics profit pool that is not yet supported by disclosed historical dollar economics.

8. Reflexivity check

The TTM revenue reflexivity check passes. QF P4 shows Automotive and services/other segment revenue of $85.430B and Energy segment revenue of $12.449B. Their sum is $97.879B, which equals consolidated TTM revenue of $97.879B. The gap is $0.000B, or 0.0%.

The TTM operating-income reflexivity check requires a calibration line because segment OI is not disclosed. The segment appendices' modeled TTM contributions imply about $3.4B from Automotive/services and about $2.739B from Energy, or $6.139B in total. QF P4 shows consolidated TTM operating income of $4.897B. The difference is $1.242B, or 1.3% of TTM revenue. Rather than claiming a false segment OI tie, this appendix carries the residual forward as an unallocated corporate / calibration expense. After that residual, TTM modeled OI ties to reported OI.

The latest completed FY revenue tie also passes. QF P2 shows FY2025 Automotive/services revenue of $82.056B and Energy revenue of $12.771B, totaling $94.827B, which equals FY2025 consolidated revenue. FY2025 segment operating income cannot be tied because Tesla did not disclose it. The historical sanity check therefore uses revenue and disclosed consolidated operating income, while preserving the segment OI data gap.

This is a key guardrail. The model compounds from a disclosed TTM revenue base and a disclosed consolidated OI base. It does not compound from a fabricated FY2025 segment OI schedule. Where Tesla withholds segment OI, the model says so and uses an explicit bridge.

9. In-progress FY reconciliation

Stage 0 did not treat FY2026 as effectively complete. The anchor is the TTM ending March 31, 2026. Therefore, the in-progress FY reconciliation is not a gating adjustment. The Q1 2026 revenue run-rate alone would annualize to $89.548B, below the $97.879B TTM base, while Q1 2026 operating income would annualize to $3.764B, below TTM operating income of $4.897B. I do not use either annualized Q1 number as the anchor because Tesla's quarterly pattern is seasonal and Energy deployments are lumpy.

For recency discipline, the base model's first forward-year revenue is checked against the TTM run-rate. Energy's appendix supplies a base TTM+1 revenue of $15.188B. Automotive/services does not publish a year-by-year bridge, so I use the smooth segment CAGR implied by its base endpoint: $85.430B to $104.986B over five years equals about 4.2% per year,

implying first-year Automotive/services revenue of about $89.026B. Combined first-year revenue is therefore about $104.214B. Compared with the TTM base of $97.879B, that is 6.5% higher, inside the 10% recency tolerance. The base model starts with a recovery, but not with an immediate step-change that outruns the last four quarters.

10. Sensitivity

Sensitivity	EPS downside	Base EPS	EPS upside	Observation
Automotive/services CAGR +/- 200 bps	$2.90	$3.08	$3.26	Auto/services revenue CAGR matters, but not enough to change the verdict.
Energy operating margin +/- 200 bps	$2.95	$3.08	$3.21	Energy margin is important but smaller than the P/E gap.
Share count +/- 5%	$2.93	$3.08	$3.24	Buybacks or dilution cannot rescue the valuation.
Tax rate +/- 300 bps	$2.96	$3.08	$3.19	Tax rate changes are second-order at the current earnings scale.

The largest modeled sensitivity here is the automotive/services growth path. A 200 bp change in the implied five-year automotive/services CAGR moves base EPS by roughly $0.18 in either direction. That is meaningful for an operating model, but it is not meaningful relative to the $25.17 required EPS. The Energy operating-margin sensitivity is similar: a 200 bp margin swing on $29.171B of horizon Energy revenue moves EPS by about $0.13. A 5% share-count swing moves EPS by about $0.15. A 300 bp tax-rate swing moves EPS by about $0.12.

The model's verdict is therefore not fragile to normal financial-statement assumptions. It is fragile only to a much larger strategic claim: that Tesla can create a new profit pool outside the disclosed segment economics. The candidate profit pools are FSD, Robotaxi, Cybercab fleet economics, Optimus, and AI infrastructure. Those may matter greatly over 20 years, but the controlled appendices do not support treating them as a March 2031 base-case earnings stream large enough to clear a P/E 15 test at $377.56.

11. Combined earnings summary table

Case	Revenue ($B)	OI ($B)	OI margin	NI ($B)	EPS	Probability	EPS x 15	vs. $377.56
Bear	$96.394	$2.383	2.5%	$2.282	$0.64	25%	$9.53	-97.5%
Base	$134.157	$13.014	9.7%	$11.051	$3.08	50%	$46.14	-87.8%
Bull	$179.447	$28.055	15.6%	$23.111	$6.43	25%	$96.50	-74.4%
Probability-weighted	$136.039	$14.116	10.4%	$11.874	$3.31	100%	$49.58	-86.9%

The probability weights are 25% bear, 50% base, and 25% bull. I do not use uniform weights because the disqualifier and moat work point to a mixed business: net cash and Energy growth are real positives, while automotive margin compression, governance concentration, capital-intensity step-up, and undisclosed AI economics are real negatives. Base deserves the highest weight because it explicitly balances those facts. Bear and bull remain symmetrical at 25% because the range of outcomes is wide, but neither should dominate the underwritten case without evidence outside the controlled appendices.

The probability-weighted EPS is $3.31, which is higher than base EPS because the bull case has asymmetric upside. It still fails the P/E 15 gate by a wide margin. Probability weighting does not solve the valuation issue.

Tie-out checks

- Reported-financial tie-out (TTM + latest completed FY): PASSED for revenue and consolidated OI. TTM segment revenue of $85.430B plus $12.449B equals consolidated TTM revenue of $97.879B. FY2025 segment revenue of $82.056B plus $12.771B equals FY2025 consolidated revenue of $94.827B. Consolidated TTM OI ties to QF P4 at $4.897B after applying the explicit $1.242B TTM calibration expense to the modeled segment OI pool. FY2025 segment OI is not disclosed, so no fabricated FY2025 segment OI tie is claimed.

- NI / shares = EPS: PASSED. Bear $2.282B NI divided by 3,592.6M shares equals $0.64. Base $11.051B divided by 3,592.6M equals $3.08. Bull $23.111B divided by 3,592.6M equals $6.43. Differences are rounding.

- Segment sum tie-out at horizon: PASSED. Bear segment revenue sums to $96.394B and combined revenue is $96.394B. Base sums to $134.157B and combined revenue is $134.157B. Bull sums to $179.447B and combined revenue is $179.447B. Corporate eliminations are zero because the data package and QF show no residual revenue segment.

- Product-to-segment rollup: PASSED with data-gap notation. The automotive/services appendix states its four product lines sum to the segment endpoint in each case: bear $58.366B + $1.441B + $0.913B + $17.405B = $78.125B; base $78.793B + $1.858B + $1.356B + $22.979B = $104.986B; bull $104.576B + $2.479B + $1.767B + $31.198B = $140.021B, subject only to rounding. The Energy appendix has one disclosed product line and therefore ties by construction.

- Weighted margin check: PASSED with limitation. Energy has one product line, so no weighted margin is required. Automotive/services has multiple product lines but does not disclose product operating margins. The appendix uses a segment-level modeled operating margin rather than pretending to compute a revenue-weighted product margin. This is the correct treatment because product OI margins are undisclosed.

- Share count path: PASSED. The model starts with 3,538.0M diluted shares, assumes no buybacks because Tesla has no recent buyback record and faces elevated capex, adds 10.9M SBC shares per year for five years, and ends at 3,592.6M. The horizon is five years, not six.

- Growth plausibility: PASSED. Base automotive/services CAGR is about 4.2%, below the services growth signal but above the recent total-segment decline; it is justified by services growth, FSD/product framing, and moderate auto stabilization rather than a separate undisclosed robotaxi line. Base Energy CAGR is 18.6%, below the FY2022-FY2025 historical Energy CAGR of 48.4% and below 1.2 times that rate. No base segment CAGR violates the stated plausibility cap.

- Historical arithmetic: PASSED. Automotive/services: $85.430B x (1 + 4.21%)^5 = $104.986B within rounding. Energy: $12.449B x (1 + 18.6%)^5 = $29.171B within rounding. Combined base: $97.879B to $134.157B implies 6.5% over exactly five years.

- Recency anchor: PASSED. Base first-forward-year revenue is about $104.214B, calculated as smooth automotive/services growth to $89.026B plus Energy appendix TTM+1 revenue of $15.188B. That is 6.5% above the TTM revenue run-rate of $97.879B, inside the 10% tolerance. The model does not start with an immediate robotaxi or Optimus revenue step-change.

- Capex and capital-allocation consistency: PASSED. The model assumes no buybacks and therefore does not use capital return to lift EPS. That is consistent with the data package's five-year history of no material common-stock buybacks and with management's 2026 capex expectation above $25B. The model also treats AI/autonomy costs through the calibration expense instead of capitalizing them away.

- P/E 15 price-gate math: PASSED as arithmetic, FAILED as investment gate. Required EPS is $25.17. Bear, base, and bull EPS are $0.64, $3.08, and $6.43. EPS x 15 is $9.53, $46.14, and $96.50. All are below the current price of $377.56. The base-case cushion is -87.8%, so the P/E <= 15 gate does not clear.

Synthesis conclusion

Tesla's controlled segment model produces a viable operating recovery, not a valuation-clearing earnings base. Base-case revenue grows to $134.157B by March 31, 2031. Base-case operating income grows to $13.014B, net income to $11.051B, and EPS to $3.08. That is a substantial improvement from the TTM operating income of $4.897B and TTM EPS sum of $1.09, but it does not come close to the earnings power required at today's price.

The main reason is not that Tesla lacks attractive assets. Energy is growing from a strong gross-margin base. Automotive/services has fleet, charging, services, software, and autonomy optionality. The company has net cash and enough liquidity to fund a heavy investment cycle. The management and moat appendices both support a YELLOW rather than FAIL qualitative view. But the P/E 15 gate is mechanical. At $377.56, Tesla must produce $25.17 of FY+5 EPS to clear

the gate. The base model produces $3.08 and the bull model produces $6.43.

The implication is a PASS on price. A BUY case would require either a dramatically lower share price or a new evidence set that supports much larger disclosed earnings from autonomy, software, robotics, or another high-margin platform. That evidence is not in the current controlled source package. Until it appears, the conservative treatment is to keep AI and Robotaxi economics as option value, not as base-case operating income.

Appendix CS - Compounder Score

Tesla, Inc. - Compounder Score

Analysis date: 2026-05-28. Diagnostic only; this appendix does not mechanically gate or override the ER2 verdict.

1. Executive Verdict

Tesla has real compounder ingredients: global manufacturing scale, net cash, a large installed vehicle base, Supercharger infrastructure, a fast-growing energy storage business, and credible AI/autonomy optionality. The evidence does not support scoring Tesla as a high-confidence 20% annualized compounder at the current price. The recent financial record shows deteriorating ROIC, compressed automotive gross margins, large forward capex, rising SBC, no capital returns, and a valuation that requires profit pools not yet visible in audited segment economics.

Compounder Score: 40 / 100. Business Quality Score: 40 / 80. 20% Return Underwriting Score: 0 / 20. Score-implied classification: Reject.

The score is capped because the 2023-2025 evidence shows NOPAT and ROIC falling while invested capital and strategic spend rise. Energy storage is the strongest current incremental-quality signal, but it is still a minority of revenue. AI, FSD, Robotaxi, Cybercab, Optimus, and software economics may be material over time, but the controlled ER2 package does not provide standalone revenue, margin, or ROIIC proof.

2. Data Source Map

Evidence item	Source used	Confidence
Price, market cap	`quant_foundation.md` P0/P6; latest FMP quote at $373.1401 and market cap $1,400.2B, timestamp 2026-04-27 16:52:29 UTC	High for run package; not refreshed live by this worker
Enterprise value	Derived from QF market cap less net cash: $1,400.2B - ($44.743B cash and short-term investments - $9.229B debt/finance leases) = about $1,364.7B	Medium
Income statement	`quant_foundation.md` P3/P4 and `data_package.md` Section 2	High
Balance sheet	`quant_foundation.md` P6	High
Cash flow	`quant_foundation.md` P6 and `data_package.md` Section 2	High
Share count	`quant_foundation.md` P6 and `appendix_synthesis.md` share-count path	High
SBC	`appendix_synthesis.md` annualizes Q1 2026 SBC of $1.030B because a full TTM SBC line was not separately supplied	Medium-low
Segment data	`quant_foundation.md` P1/P2; `data_package.md` Sections 3-5; segment appendices	High for revenue/gross profit; low for segment OI
Management and capital allocation	`appendix_management.md`	Medium-high
Moat and competition	`appendix_moat.md`; segment appendices	Medium
2031 model and price discipline	`appendix_synthesis.md`	Medium-high

I backfilled from local ER2 artifacts. No live fetch was needed because the controlling local package already contains current run quote, financials, segment histories, management commentary, and valuation work.

3. Key Financial and Quality Metrics

Metric	Evidence	Score implication
TTM revenue to 2026-03-31	$97.879B	Large scale
TTM operating income	$4.897B	5.0% operating margin
TTM FCF	$7.000B	Positive but at risk from >$25B 2026 capex guide
Cash and short-term investments	$44.743B	Strong liquidity

Metric	Evidence	Score implication
Debt and finance leases	$9.229B	Net cash balance sheet
Diluted shares, Q1 2026	3,538M	Dilution needs monitoring
FY2021-FY2025 revenue CAGR	About 15.2%	Good historical scale growth
FY2021-FY2025 NOPAT CAGR	About -13.8% using data-package NOPAT figures	Weak incremental profitability
FY2021-FY2025 FCF CAGR	About 15.4%	Positive but uneven
5-year median ROIC	19.7%	Good median, but latest is poor
FY2025 ROIC	6.6%	Below compounder hurdle
3-year / 5-year ROIIC	Negative or insufficiently supported; NOPAT declined from FY2022 and FY2021 while capex continued	Major cap
Automotive/services gross margin	26.9% FY2021 to 16.2% FY2025; 17.2% TTM	Weak pricing-power evidence
Energy gross margin	-4.6% FY2021 to 29.8% FY2025; 31.9% TTM	Strongest quality signal
FCF yield	About 0.5% on $1,400.2B market cap	Valuation does not help
EV / TTM NOPAT	About 348x using normalized TTM NOPAT of $3.918B	Implies extreme growth requirement

Normalized TTM NOPAT uses operating income of $4.897B multiplied by an assumed 20% tax rate, consistent with the synthesis tax framework. This produces about $3.918B of NOPAT. That approximation is enough for diagnostic scoring; the conclusion is not sensitive to small tax changes.

4. Rubric Scorecard

Category	Score	Max	Rationale
Incremental Returns on Capital	7	25	Median ROIC is respectable, but latest ROIC fell to 6.6%, ROIIC is negative/insufficient, and automotive margins compressed sharply.
Reinvestment Runway	14	20	Large markets in EVs, grid storage, charging, autonomy, and robotics; evidence strongest in energy storage, weaker in undisclosed AI/autonomy economics.
Durability of Moat	8	15	Real assets and brand, but current moat evidence is transitional and pricing power is weak in core auto hardware.
Accounting and Financial Quality	6	10	Positive cash generation and strong balance sheet; SBC, dilution, segment OI opacity, and governance complexity cap the score.
Capital Allocation Discipline	5	10	No buybacks at inflated prices and no material M&A binge, but >$25B capex, related-party investment, and low recent ROIC require proof.
Price and 20% Underwriting	0	20	Base/bear/bull five-year endpoint values fail the hurdle by a wide margin without relying on unsupported profit pools.
Total	40	100	Reject under this diagnostic rubric.

5. ROIIC and Reinvestment Analysis

The evidence does not support awarding a high ROIIC score. `data_package.md` shows ROIC falling from 50.5% in FY2022 to 19.7% in FY2023, 12.1% in FY2024, and 6.6% in FY2025. NOPAT fell from $12.5B in FY2022 to $3.2B in FY2025 while capex remained material. That makes 3-year ROIIC negative under any reasonable reinvestment definition. FY2021-FY2025 also does not support a positive 5-year ROIIC conclusion because NOPAT fell from $5.8B to $3.2B while the company invested heavily in factories, AI, energy, service, and charging.

I do not calculate a precise acquisition-inclusive ROIIC because the controlled package does not provide all working-capital, capitalized R&D, lease, disposal, and acquisition components needed for a clean denominator. Unsupported precision would be worse than a conservative score. The qualitative conclusion is strong enough: recent incremental capital has not yet translated into higher consolidated NOPAT.

6. Runway Analysis

Tesla's runway is real. Automotive/services had $85.430B of TTM revenue, and Energy had $12.449B. Energy is the cleanest growth evidence: FY2022-FY2025 revenue CAGR was 48.4%, and gross margin reached 31.9% on the TTM anchor. The storage runway is supported by grid demand, Megapack, Megablock, Megapack 3, Lathrop, Houston, software, and bankability.

The runway score is capped because the largest revenue base is still automotive/services, where FY2025 revenue declined and gross margin is far below the FY2021-FY2022 level. The most valuable runway claims, including FSD, Robotaxi, Cybercab, Optimus, and AI infrastructure, are not separately disclosed as revenue or profit lines. They remain option value rather than base-case proof.

7. Moat Analysis

The moat appendix supports a YELLOW read, not a clean PASS. Tesla has brand, direct distribution, manufacturing scale, battery/powertrain knowledge, software updates, charging infrastructure, a fleet-data loop, and energy storage capability. Energy storage and charging are the most concrete durability signals.

The weakness is that the moat has not protected consolidated margins recently. Consolidated operating margin was 16.8% in FY2022 and 4.6% in FY2025; TTM operating margin was about 5.0%. Automotive/services gross margin fell from above 26% in FY2021-FY2022 to 16.2% in FY2025. AI/autonomy could create a much stronger moat, but the current financial statements do not prove it yet.

8. Accounting and Capital Allocation Analysis

The financial-quality positives are meaningful: Tesla has net cash, positive TTM FCF, no material common dividends or buybacks, and no current material weakness or restatement flag found in the reviewed local ER2 package. It did not lever the balance sheet to pursue large conventional M&A.

The concerns are also material. `appendix_synthesis.md` annualizes Q1 2026 SBC of $1.030B to $4.120B because full TTM SBC was not separately supplied. The 2025 CEO Performance Award and key-person dependence are not normal public-company governance features. `appendix_management.md` also flags the $2.0B SpaceX common stock investment and related-party complexity. Capital allocation is currently a high-burden-of-proof AI/autonomy/energy reinvestment cycle, not a demonstrated high-ROIIC harvest phase.

9. 20% Return Underwriting

I use the local synthesis endpoint values as the conservative return anchor because they are tied to the controlled segment model and a P/E 15 discipline. At the QF price of $373.1401, five-year values of $9.53, $46.14, and $96.50 per share imply approximate annualized returns of -52.0%, -34.1%, and -23.8% for bear, base, and bull cases, before dividends. The company has no common dividend and no modeled buybacks.

Case	2031 EPS	Exit value used	Annualized return from $373.1401
Bear	$0.64	$9.53	-52.0%
Base	$3.08	$46.14	-34.1%
Bull	$6.43	$96.50	-23.8%

The max buy price for a 20% five-year annualized return on the base endpoint is about $18.54, calculated as $46.14 / 1.2^5. This is a diagnostic math output, not a target price. The 20% case at today's price would require either a much larger high-margin profit pool than the controlled segment model supports, or an exit multiple framework that capitalizes unsupported perfection.

10. Hard Veto Checklist

Hard veto	Status	Evidence
ROIIC below cost of capital with no credible path	Watch / partial fail	Recent NOPAT declined despite reinvestment; Energy offers a path but not enough proof at company scale.
ROIC high only because invested capital is tiny	Pass	ROIC is not high today; the problem is deterioration, not an accounting artifact.

Hard veto	Status	Evidence
Growth requires external financing	Pass	Net cash balance sheet, but 2026 capex may pressure FCF.
Share count rises without per-share proof	Watch	SBC issuance is material; no buyback offset modeled.
Large acquisition habit without returns	Pass / Watch	No material M&A binge; related-party SpaceX investment deserves monitoring.
FCF structurally lags earnings	Watch	TTM FCF is positive, but capex step-up can pressure conversion.
Customer/regulation/cyclicality can impair equity	Watch	EV competition, incentives, tariffs, autonomy regulation, and energy project cyclicality matter.
20% case requires terminal multiple expansion	Fail	Controlled model does not clear at conservative exit values.
Needs flawless execution to justify price	Fail	Current price requires major unproven autonomy/software/robotics economics.
Cannot explain moat in one paragraph	Pass	Moat is explainable but transitional.
Governance/accounting issues impair trust	Watch	Related-party and key-person risks are real; no accounting breakdown found.
Balance sheet risk can wipe out equity	Pass	Net cash and high liquidity.

11. Final Decision

Score-implied classification: Reject. This is a rejection under the diagnostic CompounderScorer rubric at the current price, not a claim that Tesla is a bad company or that ER2 must reject the stock mechanically.

Compounder Score note: 40/100; Tesla has real assets and runway, especially Energy, but recent ROIIC/ROIC deterioration and valuation overwhelm the compounder case.

Business Quality Score note: 40/80; scale, net cash, brand, charging, and energy storage earn credit, but auto margin compression, negative/unsupported ROIIC, SBC, and governance complexity cap quality.

20% Return UW Score note: 0/20; the controlled five-year model does not support a 20% annualized return without unsupported high-margin profit pools or unrealistic terminal valuation.

12. Machine-Readable JSON

See `compounder_score.json` in this folder for the machine-readable score file.

Appendix CSA - Scoring Audit

Tesla, Inc. - Scoring Audit

Analysis date: 2026-05-28. This audit reviews `appendix_compounder_score.md` and `compounder_score.json` against the controlled ER2 source files in this folder. It does not re-underwrite Tesla from scratch and does not override the ER2 verdict gates. It asks whether the published diagnostic score is supported by the evidence.

1. Original vs Audited Scores

Item	Original	Audited	Notes
Business Quality Score / 80	40	33	Reduced for uncalculated ROIIC, qualitative autonomy optionality, incomplete SBC/FCF detail, and capital-allocation proof gaps.
Valuation / 20% Return UW Score / 20	0	0	Preserved. The controlled five-year model is far below the 20% hurdle and already gives no valuation credit.
Total Score / 100	40	33	Reject remains the score-implied classification.
Classification	Reject	Reject	Threshold tests fail on total score, business quality, valuation score, base IRR, bear IRR, hard vetoes, and multiple-expansion discipline.

The original score reconstructs cleanly from the scorer files: Business Quality 40/80, Valuation / 20% Return Underwriting 0/20, total 40/100, classification Reject. The original JSON reports base IRR -34.1%, bear IRR -52.0%, bull IRR -23.8%, and a maximum buy price for a 20% five-year IRR of $18.54 using the base endpoint. The markdown and JSON agree on the major score fields.

The audited score is lower, but not because the original scorer was promotional. The scorer already rejected the valuation and treated FSD, Robotaxi, Cybercab, Optimus, and AI infrastructure as option value rather than proven base-case earnings. The reductions are calibration haircuts where the rubric requires measured evidence rather than directional statements.

2. Score Reductions and Reasons

Incremental Returns on Capital is reduced from 7/25 to 6/25. The scorer correctly cites ROIC falling from 50.5% in FY2022 to 6.6% in FY2025, but ROIIC is not actually calculated in `compounder_score.json`; 3-year ROIIC, 5-year ROIIC, acquisition-inclusive ROIIC, and reinvestment rate are all null. The narrative says ROIIC is negative under any reasonable definition because NOPAT fell while capital was invested. That is directionally right, but Category 1B must be zero when ROIIC is not calculated. Some points remain for the historical 5-year median ROIC, positive TTM FCF, and the fact that ROIC is not an artificially tiny-capital artifact. No high incremental-return score is supportable.

Reinvestment Runway is reduced from 14/20 to 11/20. Energy storage has real evidence: TTM revenue of $12.449B and TTM gross margin of 31.9% are supported in the scorer and source files. The problem is scale and mix. Auto/services remains 87.3% of TTM revenue and has margin compression. The most attractive runway claims rely on FSD, Robotaxi, Cybercab, Optimus, and AI economics that the data package says are not separately disclosed as historical dollar revenue or margin lines. Under the CSA cap, qualitative moat/runway points resting mainly on management aspiration and undisclosed economics cannot receive full credit.

Durability of Moat is reduced from 8/15 to 7/15. The moat evidence is real but transitional. `appendix_moat.md` supports brand, manufacturing scale, charging, fleet data, software updates, and energy storage, but also states that AI/autonomy is plausible rather than banked and that consolidated margin compression is not clean moat proof. Tesla should receive credit for assets and a credible 2046 YELLOW case, not for a proven software-platform moat.

Accounting and Financial Quality is reduced from 6/10 to 5/10. The company has net cash and positive FCF, but the score depends on annualized Q1 2026 SBC because full TTM SBC was not separately supplied. The scorer reports SBC-to-FCF at 58.9%, which is material. Segment operating income is undisclosed, and the FCF conversion figure is summarized rather than shown as a multi-year bridge. Those gaps should trim confidence.

Capital Allocation is reduced from 5/10 to 4/10. Tesla avoided leverage-heavy M&A and buybacks at a premium valuation, but current capital allocation requires proof. The source files show more than $25B of expected 2026 capex, potential negative FCF pressure, a $2.0B SpaceX investment, related-party complexity, and low recent ROIC. A mid-score is still too generous until AI, robotaxi, Optimus, and energy reinvestment produce measured high returns.

Valuation / 20% Return Underwriting remains 0/20. The original scorer already gives no credit because the P/E 15 model produces bear/base/bull values of $9.53, $46.14, and $96.50 versus a roughly $373-$378 share price. No reduction is possible below zero.

3. Unsupported Claims

The evidence does not support treating FSD, Robotaxi, Cybercab, Optimus, or AI infrastructure as proven high-margin profit pools. The controlled source files repeatedly say these lines lack standalone historical revenue, margin, operating income, churn, attach-rate economics, or ROIIC disclosure. The scorer mostly handles this properly, but runway and moat points still benefit from these themes. The audited score keeps some option-value credit while refusing to treat it as current proof.

The evidence partly supports "credible AI/autonomy optionality" as a strategic statement, but it does not support high business-quality points based on realized economics. `data_package.md` and `appendix_B_automotive_services_other.md` support FSD customer commentary and early Robotaxi activity, but they also warn that no separate dollar revenue line exists.

The evidence does not support a precise acquisition-inclusive or investment-inclusive ROIIC view. The scorer explicitly says the denominator is incomplete. That honesty is good, but the missing calculation still lowers the score.

4. Calculation Errors

No fatal arithmetic error was found in the valuation score. Normalized TTM NOPAT of about $3.918B is consistent with $4.897B of TTM operating income taxed at 20%. EV / NOPAT of roughly 348x is directionally consistent with enterprise value near $1.365T divided by that NOPAT figure.

The base/bear/bull IRR mechanics are directionally correct using a five-year period and the stated endpoint values. $46.14 divided by 1.2^5 equals about $18.54, so the max buy price for a 20% base-case IRR ties. The IRRs are not sensitive to small price differences between the QF quote and the synthesis quote; both lead to decisive failure.

The calculation break is ROIIC precision, not the valuation math. The scorer records ROIIC fields as null while still assigning 7/25 to incremental returns. This is not a fabricated positive ROIIC score, but it leaves the category more qualitative than the rubric wants.

5. Missing Data

The most important missing evidence is standalone economics for FSD, Robotaxi, Cybercab, Optimus, and software/AI monetization. Without disclosed revenue, margin, capex, insurance, safety, cleaning, maintenance, compute, and regulatory cost data, these can only be option value.

The second missing item is a calculated 3-year, 5-year, and acquisition-inclusive ROIIC bridge. The source files give enough evidence to reject a high ROIIC claim, but not enough to publish a reliable precise ROIIC denominator.

The third missing item is full TTM SBC and a more complete dilution bridge, including the possible CEO Performance Award effect. Annualizing Q1 2026 SBC is conservative enough to prevent false EPS maintenance, but it is still a proxy.

The fourth missing item is segment operating income. Tesla discloses segment gross profit but not segment OI, so the segment appendices and synthesis use modeled allocations. That is acceptable for an ER2 model if labeled, but it lowers scoring confidence.

6. Hard-Veto and Threshold Test Audit

The original hard vetoes are supportable. The 20% case requires either unsupported profit pools or unrealistic terminal valuation. The current price needs flawless execution from autonomy/software/robotics. Recent ROIIC is below hurdle or insufficiently supported.

The threshold classification remains Reject. Total score is below 70 and far below 80. Business Quality is below 65/80. Valuation score is below 15/20. Base-case IRR is negative, bear-case IRR is negative, and the company does not clear the

20% hurdle without relying on profit pools outside the controlled segment economics. The score cannot be "Buy only at lower price" under the diagnostic rubric because business quality is not strong enough after the ROIIC and disclosure haircuts; it is better described as a rejected current setup with watchlist-worthy assets.

7. Final 20% Hurdle Pass/Fail

Final 20% hurdle result: Fail. The base endpoint of $46.14 per share versus the current price around $373-$378 implies a large negative annualized return, not a borderline miss. The P/E 15 gate would require FY+5 EPS of about $25.17 at the synthesis price, while the controlled base case produces $3.08 and the bull case produces $6.43. A 20% case at the current price would require a different evidence set: large, disclosed, high-margin earnings from autonomy, software, robotics, or another platform.

8. Dream Business / Dream Investment Classification

Audited classification: neither. Tesla may become a dream business if energy, autonomy, software, and robotics convert into durable high-return profit pools, but the current consolidated evidence does not show that yet. It is also not a dream investment at the current price because the base case fails the 20% hurdle by a wide margin.

Single biggest reason: the stock price capitalizes a much larger high-margin autonomy/software/robotics profit pool than the controlled ER2 source package can verify.

9. Stage 7 Scorecard Notes

Compounder Score note: 33/100; Tesla has real assets and energy/autonomy optionality, but audited ROIIC, disclosure, SBC, and valuation evidence do not support a current compounder score.

Business Quality Score note: 33/80; scale, net cash, energy storage, charging, and fleet assets earn credit, but falling ROIC, uncalculated ROIIC, auto margin pressure, and undisclosed autonomy economics cap quality.

20% Return UW Score note: 0/20; the controlled five-year model produces negative IRRs at the current price, and a 20% case would require unverified high-margin profit pools or an unrealistic valuation framework.

10. Auditor JSON

See `compounder_score_audit.json` in this folder for the machine-readable scoring audit.

Appendix RT - Red Team

Tesla, Inc. - Red Team Appendix

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Stage 0 anchor

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

1. Red-team verdict

Tesla does not break as an operating company in this red team. It breaks as an underwritable security at the current price. The controlled synthesis already fails the P/E 15 gate in every case: base EPS at March 31, 2031 is $3.08, bull EPS is $6.43, and the required EPS at the $377.56 price used in the synthesis is $25.17. That means even the bull case is not close. A red team does not need to invent a collapse to reach a negative conclusion; it only needs to ask whether the current evidence supports the earnings pool the stock is discounting. It does not.

The most important red-team point is that the valuation case requires a profit pool outside disclosed segment economics. The synthesis properly refuses to add a standalone Robotaxi, FSD, Optimus, Cybercab fleet, or AI infrastructure revenue line because Tesla does not disclose historical dollars for those activities. That discipline is exactly what makes the conclusion harsh. The underwritten business is still dominated by Automotive and services/other, which supplied $85.430B of the $97.879B TTM revenue base, while Energy supplied $12.449B. The market price implies something much larger and much more profitable than a moderate auto recovery plus strong storage growth. The file set does not prove that business exists by March 31, 2031.

My conclusion is conditional but severe: the thesis survives only as a story about assets and optionality, not as a Gideon BUY. At the current price, the correct red-team position is that the investment case should be rewritten around a valuation failure and a disclosure gap. Upgrade requires hard evidence of separately monetized autonomy or robotics economics. Exit, for anyone still underwriting a long position, should be forced by evidence that services/FSD/Robotaxi monetization is not scaling while capex stays elevated.

2. The most fragile assumption

The most fragile assumption is the Automotive and services/other base-case transition from a competitive hardware business into a better-margin services and software business. The specific line is Services and other in the automotive/services appendix: $13.637B of TTM revenue growing at an 11.0% CAGR to $22.979B by March 31, 2031. The related segment-level assumption is Automotive and services/other operating margin rising to 8.0% from a modeled current contribution margin near 4.0%. This is not the biggest numerical line in the model, but it is the weakest gate because it carries the FSD/Robotaxi monetization bridge without the benefit of separate disclosure.

Why this is fragile: the historical services line is strong, but it is not a clean software line. The data package says Services and other includes used vehicles, non-warranty service, paid Supercharging, parts, insurance, collision, and early Robotaxi activity. Those items have very different margins. Used vehicles and collision can be revenue-rich but margin-poor. Supercharging has site, electricity, maintenance, reliability, and capex costs. Insurance has claim volatility and state regulation. Service grows with fleet size but can signal warranty or complexity burden rather than pure recurring revenue. FSD subscriptions may be high margin, but Tesla does not disclose FSD revenue, churn, attach rate by cohort, gross margin, or renewal economics. Robotaxi revenue is not separately disclosed either. The model therefore uses a blended services line to stand in for a strategic claim that the company itself has not given investors the data to verify.

The historical gap matters. Automotive sales revenue declined from $78.509B in FY2023 to $65.821B in FY2025. Regulatory credits fell from $2.763B in FY2024 to $1.993B in FY2025. Automotive/services gross margin fell from 26.5% in FY2022 to 16.2% in FY2025, with TTM at 17.2%. The base case assumes the segment can grow revenue at 4.2% and double modeled operating contribution margin to 8.0% even as the vehicle line only grows 3.0%, leasing grows 1.0%, and credits decline 8.0%. That places the burden on services mix and FSD/Robotaxi economics. If those services dollars are lower-margin fleet support rather than high-margin software, the operating margin recovery fails.

The synthesis sensitivity says Automotive/services CAGR +/- 200 bps moves base EPS from $3.08 to $2.90 or $3.26. That sensitivity is too small to capture the real red-team risk because the fragility is not only revenue CAGR. It is the combined assumption that revenue grows and mix expands and operating margin doubles. A more realistic break is Services and other growing only 5% per year, like the bear case, and Automotive/services margin staying near 4% instead of 8%. On the base endpoint of $104.986B, every 400 bps of segment operating margin is about $4.2B of operating income. After a 20% tax rate and 3.593B shares, that is roughly $0.94 of EPS. Base EPS would fall from $3.08 toward the low $2 range before considering any revenue shortfall. That still would not change the PASS conclusion because the stock already fails, but it would invalidate the moderate-recovery narrative.

3. The most optimistic Stage-5 number

The single Stage-5 number most likely to be revised down is the base-case Energy operating margin of 21.0%, equal to $6.126B of modeled Energy operating income on $29.171B of revenue. Energy is Tesla's best current segment story: FY2025 gross margin was 29.8%, TTM gross margin was 31.9%, and the historical revenue CAGR from FY2022 to FY2025 was 48.4%. The red-team issue is that the Stage-5 model leans on gross-margin evidence and a modeled opex allocation, while management has already warned about margin compression from low-cost competition, policy uncertainty, and tariffs.

This number is more optimistic than it looks because Energy is being asked to do three things at once. It must more than double revenue from the TTM base. It must absorb Q1 2026 revenue down 12% year over year as timing rather than a demand or execution signal. It must keep operating economics well above typical industrial hardware levels while the BESS market scales and procurement becomes more competitive. The Energy appendix acknowledges the CFO warning and still keeps base operating margin only about 100 bps below the current modeled TTM reference. That is plausible, but it is the Stage-5 number I would haircut first.

The bear mechanism is straightforward. Low-cost Chinese battery suppliers and local integrators compress turnkey BESS pricing. Tariffs raise input costs or force localization before Tesla has full cost parity. Battery pack capacity remains the limiter. Project execution and warranty support keep opex from scaling down. If gross margin falls into the low-to-mid 20s and allocated opex remains 9-10% of revenue, the bear-case 13.0% operating margin becomes more realistic than 21.0%. On the base Energy revenue endpoint, an 800 bps margin shortfall is about $2.3B of operating income, or roughly $0.51 of EPS after tax. Again, that does not rescue or kill the P/E 15 gate by itself; it shows that even the best evidenced growth segment has downside to the model's profit contribution.

4. Strongest bear case

The strongest bear case is that Tesla is being valued as a software and autonomy platform while the financial statements still describe an increasingly competitive auto manufacturer plus a promising but commoditizable energy-storage supplier. Core auto hardware has already lost margin: consolidated operating margin fell from 16.8% in FY2022 to 4.6% in FY2025, and TTM operating margin is only about 5.0%. Management is increasing capital intensity into AI, robotics, chips, factories, and related infrastructure before the company discloses standalone revenue and profit for FSD, Robotaxi, Optimus, or Cybercab. If those products are delayed, regulated market-by-market, or economically diluted by insurance, teleoperations, cleaning, charging, maintenance, safety, and compute costs, Tesla remains a lower-return physical-asset company while the stock price still capitalizes an undisclosed high-margin future.

The timeline is not 20 years. It should show up over the next two to six quarters. If capex rises above $25B annualized, free cash flow turns negative for multiple quarters, and Services and other growth decelerates without a disclosed FSD/Robotaxi revenue breakout, the market will have less room to treat the transition as self-funding. The observable anchor is not a CEO claim about product potential. It is a line-item combination: Services and other growth, consolidated operating margin, free cash flow, and capex. If those lines move against each other, the bear case is being validated.

5. Cross-examination of management commentary

First, Elon Musk said on the Q4 FY2025 call that Tesla expected fully autonomous vehicles in "somewhere between a quarter and half of the United States by the end of the year." That statement should be treated as aspiration, not underwriting evidence. The data package itself notes the rollout had been staged, subject to approvals and safety validation. The skeptical interpretation is that regulatory geography, fleet operations, insurance, weather, remote support, and safety cases are the bottleneck, not only model capability. If the statement is wrong, it will show first in limited metro coverage, continued supervised FSD dependency, low reported Robotaxi revenue inside Services and other, and no separate disclosure of ride volume, revenue per mile, or contribution margin.

Second, Vaibhav Taneja said Tesla now emphasizes "FSD as a product and vehicle as only the delivery mechanism." That is the most important strategic sentence in the data package, and also the most dangerous. If the vehicle is merely the delivery mechanism, investors need software-product disclosure. Instead, FSD remains hidden in broader automotive or services economics. The skeptical read is that the statement describes management intent more than proven monetization. If it is wrong, Automotive/services gross margin will fail to recover despite FSD customer growth, and Services and other revenue will look like fleet support rather than software leverage.

Third, Musk said Optimus would be Tesla's biggest product and "probably the biggest product ever." The red-team response is simple: no historical revenue line, no separate cost line, no production-rate certainty, and no disclosed customer economics. The Q1 2026 commentary that start of production might occur around late July or August does not equal material revenue. If the Optimus claim is wrong, it may not show up as an immediate revenue miss because the model assigns no base-case Optimus revenue. It will show up as capex, R&D, SBC, and management attention competing with auto, Energy, and FSD priorities without measurable return.

Fourth, Taneja's capex commentary is the most financially concrete warning in the package: 2026 capex expectation moved from more than $20B to more than $25B, and the management appendix notes free cash flow may be negative for the remainder of 2026. This is not a normal sustaining-capex profile for a company whose FY2025 operating income was $4.4B and TTM operating income was $4.897B. If the capex is high-return, the stock may deserve option value. If it is a scattered set of AI, chip, robotics, factory, battery, and related-party ecosystem bets, then ROIC can stay below Gideon's hurdle for years.

6. Stage-5 tie-out stress

The Stage-5 recency anchor is mathematically acceptable but economically generous. Q1 2026 annualized revenue would be $89.548B, below the $97.879B TTM base, and Q1 operating income annualized would be $3.764B, below TTM operating income of $4.897B. The synthesis correctly avoids annualizing Q1 because Energy is lumpy and autos are seasonal, but the direction of the latest quarter still matters. The base model's first forward-year revenue estimate of about $104.214B is 6.5% above TTM. That is inside the formal 10% tolerance, but it embeds recovery rather than deterioration.

The share-count path is not aggressive. It assumes no buybacks, adds SBC dilution, and ends at 3,592.6M diluted shares. Red team has no major objection there. The bigger issue is the CEO Performance Award and SBC context. Q1 2026 SBC was $1.030B, up from $573M in Q1 2025. The 2025 CEO Performance Award is performance-based and aligned to extreme market cap, vehicle, FSD, robotaxi, bots, and EBITDA milestones, but the scale reinforces key-person dependency and potential dilution if the story works.

The product where the forward model most clearly exceeds recent proof is not Energy revenue growth; it is autonomy-enabled services economics. Services and other gets an 11.0% base CAGR and is used as the place where FSD, subscriptions, Robotaxi, Supercharging, insurance, service, and fleet economics begin to matter. Yet the model cannot separate high-quality recurring software from lower-quality used-vehicle and service revenue. A skeptical IC should demand this disclosure before moving from PASS to WATCH or BUY.

7. Governance and key-person risk

Tesla's governance risk is not that the board lacks formal independence on paper. It is that the company's strategy, investor base, talent magnet, compensation architecture, and public narrative are still centered on one person. The management appendix is clear: Musk is the product architect, capital allocator, public communicator, and valuation anchor. The board and shareholders approved a large 2025 CEO Performance Award because retaining him is viewed as central to the future. That can be rational and still be a red flag.

Related-party complexity raises the governance haircut. The Q1 2026 quarter included a $2.00B SpaceX common-stock investment and disclosed ordinary-course Megapack sales to SpaceX. The FY2025 10-K and management appendix also discuss xAI-related arrangements and ecosystem overlap. A company asking investors to fund more than $25B of capex in

2026 should be exceptionally clean about capital allocation boundaries. Instead, shareholders must evaluate Tesla-specific AI, robotics, energy, chip, and factory spending alongside investments and collaborations involving Musk-affiliated entities. The downgrade trigger here is a large additional related-party capital commitment without tight shareholder approval, or evidence that compute, talent, or management attention is being diverted away from Tesla when Tesla's own projects are under-earning.

8. AI and Robotaxi non-disclosure risk

The AI/Robotaxi problem is not that the products are fake. The problem is that they are not auditable in the way the valuation requires. The data package lists nearly 1.3M paid FSD customers in Q1 2026 and staged Robotaxi progress. The moat appendix gives Tesla credit for a potentially powerful fleet-data/autonomy loop. But the same controlled source set says there is no separate FSD revenue line, Robotaxi revenue line, Optimus revenue line, Cybercab economics, or segment operating income disclosure. That means the highest-return story is hidden inside segments whose current consolidated margin profile is weak.

This non-disclosure creates asymmetric underwriting risk. Bulls can capitalize enormous future profit pools because no line item disproves them. Bears can point to consolidated margins and say the profit pool has not arrived. The disciplined approach is to require disclosure before upgrading. A proper upgrade signal would be Tesla reporting, or making calculable with audited support, at least $5B of annualized high-margin autonomy/software/Robotaxi gross profit, with contribution economics that remain positive after insurance, support, charging, cleaning, maintenance, safety operations, compute, and depreciation. Without that, autonomy is option value, not base-case EPS.

9. Energy downside

Energy is the best part of the operating story, so it deserves a hard stress test rather than a polite compliment. The base case assumes revenue grows from $12.449B TTM to $29.171B and operating income reaches $6.126B. That is a major profit contribution. But Q1 2026 Energy revenue was down 12% year over year, storage deployments were down sequentially, and management simultaneously said demand was strong, battery pack capacity was the limiter, and margins face low-cost competition, policy uncertainty, and tariffs. Those facts can all be true, but they are not automatically bullish. They describe a segment where customer demand may exceed Tesla's ability to deliver at attractive margin.

The bear case is not that grid storage demand disappears. It is that the industry grows into a procurement-led hardware market. Tesla may remain a large supplier while margin per project falls. If Energy deployments grow but gross margin falls below 25% for two consecutive quarters, or if revenue growth stays below 10% while management still cites pack capacity constraints, the base Energy profit case should be cut. A warranty, fire-safety, or field-quality event would be especially damaging because bankability is part of Tesla's Energy moat.

10. Signals that force exit or upgrade

Exit signal: if over the next two reported quarters Services and other growth falls below 15% year over year while consolidated operating margin remains below 6% and capex annualizes above $20B, the thesis should be treated as failing transition proof. That combination would say the company is spending like an AI/autonomy platform while still earning like a pressured manufacturer. It also directly attacks the base model's services-led Automotive/services margin recovery.

Second exit signal: if Energy gross margin falls below 25% for two consecutive quarters while Energy revenue growth is below 10% year over year, cut the Energy base-case operating margin from 21% toward the 13% bear case. This would not be a timing issue; it would be evidence that BESS pricing, tariffs, localization, warranty, or execution costs are overwhelming scale.

Upgrade signal: upgrade from PASS only if Tesla discloses or makes independently calculable a high-margin autonomy/software profit pool large enough to change EPS math. My threshold is at least $5B of annualized gross profit from FSD, Robotaxi, autonomy software, or related fleet services, with enough cost detail to show positive contribution after the operating costs of the network. A weaker signal would be audited disclosure of Robotaxi ride volume, revenue per mile, cost per mile, utilization, safety interventions, and market-level contribution margin across multiple metros. A narrative expansion target is not enough.

11. What would falsify the bear case

The bear case would be falsified by evidence that Tesla's capital intensity is creating a high-return platform faster than auto commoditization is eroding the base. The cleanest falsifier is not a higher stock price. It is financial disclosure: Services and other sustaining 25% or better growth for several quarters, Automotive/services gross margin moving back above 20% without

credit dependence, consolidated operating margin moving above 10%, and free cash flow staying positive after elevated capex. If that occurs while Tesla discloses meaningful FSD/Robotaxi economics, the red-team argument that the platform is unproven becomes stale.

Energy could also falsify the bear case. If Energy revenue reaccelerates above 25% year over year, gross margin remains above 30% after tariffs normalize, and backlog/deployment commentary is matched by actual revenue conversion, the 21% operating margin base case will look conservative rather than optimistic. That would not by itself clear the current valuation, but it would validate Tesla's ability to compound outside autos.

Governance could improve the odds. A clear related-party capital policy, no further large investments in Musk-affiliated companies without explicit shareholder approval, and more granular segment disclosure would reduce the governance discount. The single most important governance improvement would be proving that Tesla's AI compute, talent, and capital allocation are prioritized for Tesla shareholders, not the broader Musk ecosystem.

12. Final red-team conclusion

The thesis does not survive as a BUY at the current price. It survives only as an asset-rich, option-rich company whose reported economics do not yet support the valuation. The most fragile assumption is the services-led Automotive/services margin recovery. The most likely over-optimistic Stage-5 number is Energy's 21.0% base operating margin. The largest strategic blind spot is the absence of separate FSD, Robotaxi, Cybercab, and Optimus economics. The governance risk is not theoretical because the next five years require unusually high capex and unusually high trust in one founder-led ecosystem.

The synthesis should not be softened. It should say Tesla may become the company bulls describe, but the controlled evidence does not yet prove that company by March 31, 2031. At $377.56, a $3.08 base EPS and $6.43 bull EPS are not close to the $25.17 required for a P/E 15 pass. A red-team appendix cannot make the stock cheaper. It can only prevent the report from confusing optionality with underwritten earnings.

Appendix D - Data Package (Raw Historicals)

Tesla, Inc. - Data Package

PATH_RECEIVED: C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.\data_package.md

Source discipline and time anchor

Data Source Rule included and obeyed: live fetches only; do not use local data warehouse caches. Fetch live from FMP stable endpoints using `C:\Users\Admin\.codex\skills\fmp-financial-data\scripts\fmp_request.py` and from official Tesla IR/SEC sources for filings, releases, transcripts, guidance, and qualitative context. If a live fetch fails, retry the identical call once; do not substitute cached data.

Stage 0 time anchor used verbatim:

- Today: 2026-04-28.
- Company fiscal year convention: Tesla's fiscal year ends December 31.
- Most recently reported quarter: Q1 2026, quarter ended March 31, 2026, released April 22, 2026 on Tesla Investor Relations and reflected in the Q1 2026 Form 10-Q.
- TTM anchor: Q2 2025 + Q3 2025 + Q4 2025 + Q1 2026 -> TTM ending March 31, 2026.
- Forward horizon: TTM + 5 calendar years = March 31, 2031. Compounding span is exactly March 31, 2026 to March 31, 2031.

Required foundation file read: `C:\Users\Admin\OneDrive\GPT\ER 2.0\Tesla, Inc.\quant_foundation.md`. Quant foundation status: QFR cleared Wave 1 with `RECONCILIATION: 8/8 checks PASSED`. This data package uses the quant foundation as the controlling financial ground truth for TTM construction and official-vs-FMP tie-outs. New live source pulls in this run were saved under `raw/` with `_live` or `_official` names.

Key live source URLs/endpoints: FMP `/stable/income-statement`, `/stable/balance-sheet-statement`, `/stable/cash-flow-statement`, `/stable/revenue-product-segmentation`, `/stable/key-metrics`, `/stable/ratios`, `/stable/enterprise-values`, `/stable/quote`, and `/stable/earning-call-transcript` for TSLA; Tesla IR Q1/Q3/Q4 update PDFs; SEC EDGAR FY2025 10-K, Q2/Q3 2025 10-Qs, Q1 2026 10-Q, and 8-K exhibit 99.1 for Q2 2025.

1. Reporting structure and taxonomy

Tesla currently reports two reportable segments. The Automotive reportable segment includes the sale and leasing of electric vehicles, sale of automotive regulatory credits, and services and other activities that support the vehicle fleet. The Energy generation and storage segment includes sales, leasing and financing of solar energy generation and energy storage products and related services. The product-revenue lines disclosed in the financial statements are more granular than the reportable segments: automotive sales, automotive regulatory credits, automotive leasing, energy generation and storage, and services and other.

Taxonomy investigation result: reporting structure is stable across FY2023-FY2025 for the two reportable segments. The FY2025 10-K segment note gives comparable segment revenue, cost of revenues and gross profit for FY2025, FY2024 and FY2023. The QF file extends the same segment mapping back to FY2021 using official product-line disclosures. No segment realignment, reclassification 8-K, or restated segment boundary was found in the live SEC submissions pull for the last fiscal-year boundary. Flag: Tesla discloses segment gross profit, not segment operating income; any downstream segment operating income bridge must be an allocation, not a disclosed historical.

FY2025 segment revenue and percent of total revenue:

Reportable segment	FY2025 revenue ($B)	% of FY2025 revenue	Description	Source
Automotive and services/other reportable segment	82.1	86.5%	Vehicle sales/leasing, regulatory credits, used vehicles, service, Supercharging, insurance, parts and early Robotaxi activity	Tesla FY2025 10-K segment note; QF P2
Energy generation and storage	12.8	13.5%	Megapack, Powerwall, solar energy systems, leasing, financing and related services	Tesla FY2025 10-K segment note; QF P2
Total	94.8	100.0%	Consolidated revenue	FMP income-statement annual and Tesla FY2025 10-K

Geography is material. FY2025 revenue by sales location was United States $47.627B, China $20.962B, and Other international $26.238B, tying to total revenue of $94.827B. The FY2025 geographic mix was therefore 50.2% United States, 22.1% China and 27.7% other international. Q1 2026 geography from the 10-Q was United States $10.677B, China $4.184B and Other international $7.526B, tying to $22.387B.

2. Consolidated historicals (5 years, FMP-sourced)

Metric	FY2021	FY2022	FY2023	FY2024	FY2025	Source
Revenue ($B)	53.8	81.5	96.8	97.7	94.8	FMP stable income-statement annual; Tesla FY2025 10-K tie
Operating income ($B)	6.5	13.7	8.9	7.1	4.4	FMP stable income-statement annual
Operating margin (%)	12.1%	16.8%	9.2%	7.2%	4.6%	calc
Net income ($B)	5.5	12.6	15.0	7.1	3.8	FMP stable income-statement annual
EPS diluted ($)	1.63	3.62	4.31	2.04	1.08	FMP stable income-statement annual
Diluted share count (M)	3,386	3,475	3,483	3,498	3,528	FMP stable income-statement annual
Capex ($B)	8.0	7.2	8.9	11.3	8.5	FMP stable cash-flow annual
FCF ($B)	3.5	7.6	4.4	3.6	6.2	FMP stable cash-flow annual
ROIC (%)	31.0%	50.5%	19.7%	12.1%	6.6%	calc: NOPAT / avg invested capital

ROIC calculation definition: NOPAT = operating income multiplied by one minus the effective tax rate. When the effective tax rate was negative or distorted, I used a 21% normalized tax rate. Invested capital = total debt plus total stockholders' equity less cash and short-term investments, averaged with the prior year when available. Detail: FY2021: NOPAT $5.8B / invested capital $18.7B = 31.0%; FY2022: NOPAT $12.5B / invested capital $24.8B = 50.5%; FY2023: NOPAT $7.0B / invested capital $35.7B = 19.7%; FY2024: NOPAT $5.6B / invested capital $46.5B = 12.1%; FY2025: NOPAT $3.2B / invested capital $48.2B = 6.6%. FY2023 ROIC is distorted upward because the income tax line included a large tax benefit; using the normalized tax rule above avoids treating that benefit as operating profitability.

3. Segment historicals (5 years per segment)

Automotive and services/other reportable segment

Metric	FY2021	FY2022	FY2023	FY2024	FY2025	Source
Revenue ($B)	51.0	77.6	90.7	87.6	82.1	Tesla 10-K segment reporting; QF P2
YoY %	n/a	52.0%	17.0%	-3.5%	-6.3%	calc
Gross profit ($B)	13.7	20.6	16.5	14.8	13.3	Tesla 10-K segment reporting; QF P2
Gross margin (%)	26.9%	26.5%	18.2%	16.9%	16.2%	calc

Metric	FY2021	FY2022	FY2023	FY2024	FY2025	Source
Segment operating income ($B)	Not disclosed	Not disclosed	Not disclosed	Not disclosed	Not disclosed	Tesla discloses segment revenue, cost of revenue and gross profit, not segment OI

Energy generation and storage

Metric	FY2021	FY2022	FY2023	FY2024	FY2025	Source
Revenue ($B)	2.8	3.9	6.0	10.1	12.8	Tesla 10-K segment reporting; QF P2
YoY %	n/a	40.2%	54.4%	67.1%	26.6%	calc
Gross profit ($B)	-0.1	0.3	1.1	2.6	3.8	Tesla 10-K segment reporting; QF P2
Gross margin (%)	-4.6%	7.4%	18.9%	26.2%	29.8%	calc
Segment operating income ($B)	Not disclosed	Not disclosed	Not disclosed	Not disclosed	Not disclosed	Tesla discloses segment revenue, cost of revenue and gross profit, not segment OI

Tesla does not report segment-level operating income. Segment profitability in this file therefore uses disclosed gross profit and gross margin. Consolidated operating income remains the only disclosed operating income control and is used only at company level.

4. Product / sub-segment historicals

Most granular product/sub-product revenue lines separately disclosed in dollars:

Segment	Product	What it is	Dollar disclosure?	Last 3 years revenue and source
Automotive	Automotive sales	Vehicle sales excluding regulatory credits and leasing	Yes	$65.821B / $72.480B / $78.509B for FY2025/FY2024/FY2023; FY2025 10-K product revenue table
Automotive	Automotive regulatory credits	Credits sold to other manufacturers under regulatory programs	Yes	$1.993B / $2.763B / $1.790B for FY2025/FY2024/FY2023; FY2025 10-K product revenue table
Automotive	Automotive leasing	Vehicle leasing revenue	Yes	$1.712B / $1.827B / $2.120B for FY2025/FY2024/FY2023; FY2025 10-K product revenue table
Energy generation and storage	Energy generation and storage	Megapack, Powerwall, Solar Roof and related energy products/services	Yes	$12.771B / $10.086B / $6.035B for FY2025/FY2024/FY2023; FY2025 10-K product revenue table
Automotive reportable segment	Services and other	Used vehicles, non-warranty service, paid Supercharging, parts, insurance, collision and Robotaxi cost/revenue bucket	Yes	$12.530B / $10.534B / $8.319B for FY2025/FY2024/FY2023; FY2025 10-K product revenue table
Automotive / AI	FSD, Robotaxi, Cybercab, Optimus, Semi	Software or future platforms discussed operationally, not separately revenue-disclosed	No	No separate dollar revenue line in FY2025 10-K or Q1 2026 10-Q; included in automotive or services/other as applicable

Products and KPIs with operational disclosure but no separate dollar revenue line:

Segment	Product / KPI	Disclosure method	Last 4 quarter trend	Source
Automotive / AI	FSD paid customers	Subscriber/adoption commentary; no FSD revenue dollars	Q2 2025: adoption improved after V12/V13; Q3 2025: paid base about 12% of fleet; Q4 2025: nearly 1.1M paid customers; Q1 2026: nearly 1.3M paid customers	FMP transcripts and Tesla update decks

Segment	Product / KPI	Disclosure method	Last 4 quarter trend	Source
Automotive / services	Robotaxi	Early fleet/revenue costs included in Services and other; no separate dollar revenue	Q2 launch in Austin; Q3 active in Austin and Bay Area; Q4 paid rides without safety monitor in Austin; Q1 2026 fleet expanded and costs still not separated	Earnings transcripts and Q2-Q1 update decks
Automotive	Cybercab, Semi, Roadster	Product ramp and capacity status only; no revenue dollars	Q2 2025 Cybercab construction, Q3/Q4 tooling or construction, Q1 2026 volume production scheduled for 2026	Tesla update decks
Robotics	Optimus	No revenue line; construction and production-prep commentary	Q3/Q4 2025 production line preparation; Q1 2026 starter production targeted later in 2026	Tesla update decks and transcripts
Energy	Megapack / Powerwall / Megablock	Energy segment revenue dollars disclosed, product units/deployments disclosed; no product-by-product revenue dollars	Storage deployed: 9.6 GWh Q2 2025, 12.5 GWh Q3 2025, 14.2 GWh Q4 2025, 8.8 GWh Q1 2026	Tesla update decks

No back-solved product-dollar estimates are included. Tesla's FSD, Robotaxi, Cybercab, Optimus and Megapack product economics are central to the forward thesis, but they are not separately dollar-disclosed as historical revenue lines. Downstream subagents should not infer standalone revenue for these lines unless they explicitly model it as forecasted revenue.

5. Most recent quarterly trend (last 4 quarters)

Company FY ends December 31. Most recently completed fiscal quarter at time of writing: FY2026 Q1, covering January 1, 2026 to March 31, 2026, reported on April 22, 2026 via https://ir.tesla.com/press-release/tesla-releases-first-quarter-2026-financial-results and reflected in https://www.sec.gov/Archives/edgar/data/1318605/000162828026026673/tsla-20260331.htm.

Quarter	Automotive revenue ($B)	Automotive YoY	Energy revenue ($B)	Energy YoY	Services/other revenue ($B)	Services YoY	Consolidated op margin	Source
2025Q2	16.7	-16%	2.8	-7%	3.0	17%	4.1%	Tesla Q2 2025 8-K Exhibit 99.1 / SEC 10-Q
2025Q3	21.2	6%	3.4	44%	3.5	25%	5.8%	Tesla Q3 2025 Update PDF / SEC 10-Q
2025Q4	17.7	-11%	3.8	25%	3.4	18%	5.7%	Tesla Q4 2025 Update PDF / FY2025 10-K
2026Q1	16.2	16%	2.4	-12%	3.7	42%	4.2%	Tesla Q1 2026 Update PDF / SEC 10-Q

TTM ending March 31, 2026 from QF P4: revenue $97.879B, operating income $4.897B, net income attributable to common $3.862B, diluted EPS sum of quarters $1.09, free cash flow $7.000B. TTM product revenue: Automotive $71.793B, Energy generation and storage $12.449B, Services and other $13.637B. The Q1 2026 official update showed total automotive revenue up 16% YoY, Energy generation and storage revenue down 12% YoY, Services and other revenue up 42% YoY, and total revenue up 16% YoY.

6. Management commentary on forward growth - verbatim quotes

Transcript source discipline: FMP `earning-call-transcript` was live-fetched for FY2026 Q1, FY2025 Q4, FY2025 Q3, FY2025 Q2 and FY2025 Q1. The main quotes below use the last four calls. The Q1 2026 transcript returned date `2026-04-22`, matching the expected call date. Speaker titles: Elon Musk, CEO; Vaibhav Taneja, CFO; Lars Moravy, vehicle engineering executive; Ashok Elluswamy, AI/autonomy executive; Michael/Micheal Snyder, energy executive as named in the transcript.

Automotive, autonomy and services

- Source: Q1 FY2026 call, April 22, 2026. Speaker: Elon Musk, CEO. Quote: "We have just started production of Cybercab, and we'll begin production about SemiTruck soon." Topic: vehicle ramp. Interpretation: Cybercab and Semi are production-transition items, but management warned early output will follow a slow S-curve before ramping.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Elon Musk, CEO. Quote: "Demand for our Megapack is very strong, and we're excited to begin production of Megapack 3 later this year." Topic: energy demand and capacity. Interpretation: energy demand appears supply/capacity constrained rather than demand constrained, though Q1 revenue fell YoY.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "we ended the quarter with the highest Q1 order backlog in over 2 years." Topic: auto demand. Interpretation: management is arguing demand improved versus the weak 2025 base, but the data package should still anchor near-term auto revenue to TTM not aspiration.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "Our biggest limiter continues to be our battery pack capacity, and we are actively working on resolving that." Topic: production constraint. Interpretation: vehicle and energy output may be gated by battery pack capacity rather than assembly capacity alone.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "we now emphasize FSD as a product and vehicle as only the delivery mechanism." Topic: business model. Interpretation: Tesla is explicitly reframing auto hardware as the installed base for software monetization.
- Source: Q4 FY2025 call, January 28, 2026. Speaker: Elon Musk, CEO. Quote: "We expect to have fully autonomous vehicles in probably somewhere between a quarter and half of the United States by the end of the year." Topic: Robotaxi expansion. Interpretation: ambitious regulatory and operational target; treat as management aspiration, not guaranteed revenue.
- Source: Q4 FY2025 call, January 28, 2026. Speaker: Lars Moravy. Quote: "CyberCab are going to change the global market size and mix quite significantly." Topic: autonomous vehicle TAM. Interpretation: management sees Cybercab as new-market creation rather than only replacement demand.
- Source: Q2 FY2025 call, July 23, 2025. Speaker: Elon Musk, CEO. Quote: "we will be launching autonomous ride-hailing in most of the country." Topic: Robotaxi rollout. Interpretation: the Q2 thesis was broad expansion subject to approvals; Q3/Q4/Q1 commentary narrowed this to staged safety validation.

Energy generation and storage

- Source: Q4 FY2025 call, January 28, 2026. Speaker: Elon Musk, CEO. Quote: "We are building more manufacturing capacity and expect that energy will have very high growth for as far into the future as we can imagine." Topic: energy segment growth. Interpretation: management's long-duration growth view is strongest in Energy, supported by FY2025 revenue growth of 27% and FY2025 gross margin of 29.8%.
- Source: Q4 FY2025 call, January 28, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "we expect margin compression from the increased low-cost competition impacts to market from policy uncertainty, and the cost of tariffs." Topic: energy margin. Interpretation: energy growth should not be modeled with FY2025 margins automatically expanding.
- Source: Q3 FY2025 call, October 22, 2025. Speaker: Michael Snyder. Quote: "Demand for Megapack and Powerwall continues to be really strong into next year." Topic: backlog and demand. Interpretation: near-term demand was robust before Q1's sequential drop, supporting a lumpy deployment profile.
- Source: Q3 FY2025 call, October 22, 2025. Speaker: Michael Snyder. Quote: "Mega Block product, which will begin shipping next year out of Houston." Topic: product expansion. Interpretation: Megablock/Megapack 3 should be treated as a 2026 capacity and product-cycle catalyst.
- Source: Q2 FY2025 call, July 23, 2025. Speaker: Michael Snyder. Quote: "we are forecasting a very strong second half of the year as we increase deployments." Topic: energy deployments. Interpretation: this proved directionally consistent with Q3/Q4 storage deployments rising to 12.5 GWh and 14.2 GWh.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "we still expect 2026 deployments to be higher than 2025." Topic: energy deployments. Interpretation: despite Q1 2026 storage deployments down 38% sequentially, full-year guide remained growth.

AI, Optimus, chips and capital intensity

- Source: Q1 FY2026 call, April 22, 2026. Speaker: Elon Musk, CEO. Quote: "Optimus will be our biggest product -- not just Tesla's biggest product ever, but probably the biggest product ever." Topic: robotics. Interpretation: not a historical revenue source, but a core long-run option value claim.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Elon Musk, CEO. Quote: "Start of production is -- we're assuming is somewhere around the late July, August time frame." Topic: Optimus start of production. Interpretation: start does not mean material revenue; management stressed initial production rate is impossible to predict.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "our current expectation for 2025 -- 2026 is over $25 billion of CapEx." Topic: capital plan. Interpretation: capex step-up is material; free cash flow may be negative for the rest of 2026 per the same remarks.
- Source: Q4 FY2025 call, January 28, 2026. Speaker: Vaibhav Taneja, CFO. Quote: "At the moment, we are expecting that CapEx would be in excess of $20 billion." Topic: prior capex guide. Interpretation: Q1 raised the capex expectation from >$20B to >$25B.
- Source: Q4 FY2025 call, January 28, 2026. Speaker: Elon Musk, CEO. Quote: "I think Tesla needs to build a TerraFab." Topic: semiconductor vertical integration. Interpretation: this implies potential capex beyond the named 2026 factories and introduces execution and related-party governance complexity.
- Source: Q1 FY2026 call, April 22, 2026. Speaker: Elon Musk, CEO. Quote: "Tesla will be building the research fab on our Giga Texas campus." Topic: chip research fab. Interpretation: initial research fab is distinct from any eventual large-scale Terafab.

7. Capital allocation history (5 years)

Year	Capex ($B)	Capex / revenue	R&D ($B)	R&D / revenue	Buybacks ($B)	Dividends ($B)	M&A ($B)	Source
2021	8.0	14.9%	2.6	4.8%	0.0	0.0	0.0	FMP stable cash-flow and income-statement annual
2022	7.2	8.8%	3.1	3.8%	0.0	0.0	0.0	FMP stable cash-flow and income-statement annual
2023	8.9	9.2%	4.0	4.1%	0.0	0.0	0.1	FMP stable cash-flow and income-statement annual
2024	11.3	11.6%	4.5	4.6%	0.0	0.0	0.0	FMP stable cash-flow and income-statement annual
2025	8.5	9.0%	6.4	6.8%	0.0	0.0	0.0	FMP stable cash-flow and income-statement annual

Capital-allocation read-through: Tesla has not paid common dividends or executed material common stock buybacks over this period. Capital return is therefore not a current pillar of the investment case. The company is increasing capital intensity: FY2025 capex was $8.5B after $11.3B in FY2024, but management guided to more than $25B of 2026 capex on the Q1 FY2026 call. FMP and Tesla both present Q1 2025 onward capex inclusive of purchases of energy generation and storage systems, with prior periods adjusted in update decks; this is a presentation/taxonomy flag for cash-flow comparability.

8. Balance sheet snapshot (FY-1)

Item	FY2025 $B	Source
Cash and equivalents	16.5	FMP stable balance-sheet annual
Short-term investments	27.5	FMP stable balance-sheet annual
Total debt (current + LT)	8.4	FMP stable balance-sheet annual
Net debt (cash)	-35.7	calc

Item	FY2025 $B	Source
Net debt / EBITDA	-3.0x	calc
Goodwill + intangibles	0.4	FMP stable balance-sheet annual
Tangible book value	81.7	calc

Latest quarter liquidity from the Q1 2026 Form 10-Q: cash and cash equivalents $16.603B, short-term investments $28.140B, total debt and finance leases $9.229B, cash plus short-term investments $44.743B, and unused committed credit amounts $5.00B. Q1 2026 total assets were $143.724B and stockholders' equity was $84.116B in the official 10-Q. Latest DR spot-check FMP quote pull: TSLA price $377.44; market cap $1,416.3B; timestamp 2026-04-27 17:26:05 UTC.

9. Recent corporate actions (last 12 months)

- April 22, 2026: Tesla released Q1 2026 results and filed the Q1 2026 Form 10-Q; official sources were Tesla IR and SEC EDGAR accession 0001628280-26-026673.
- April 2026: Q1 2026 update reported AI5 tape-out and stated Cybercab, Tesla Semi and Megapack 3 remained on schedule for volume production starting in 2026.
- March 31, 2026 quarter: Q1 2026 10-Q disclosed $2.00B invested in SpaceX common stock during the quarter, with related-party note reference.
- January 28-29, 2026: Tesla released Q4/FY2025 results and filed the FY2025 Form 10-K; FY2025 revenue declined 3% and operating income declined 38%.
- January 2026: FY2025 10-K disclosed a related-party investment agreement around xAI and the Q4 call discussed xAI/Grok collaboration as strategic to Master Plan Four.
- 2025-2026: management described a 2025 CEO Performance Award and stock-based compensation impacts; Q1 2026 Form 10-Q reported stock-based compensation of $1.030B for the quarter versus $573M in Q1 2025.
- 2025 through Q1 2026: no common dividends or buybacks; no material M&A cash outflow recorded in FMP annual cash-flow statements.
- Regulatory / legal risk: Q1 2026 Form 10-Q points to FY2025 10-K risk factors and says there were no Rule 10b5-1 trading arrangements adopted, modified or terminated by directors/officers in the quarter.

10. Open data gaps and caveats

- Segment operating income is not disclosed. Tesla discloses reportable segment revenue, cost of revenue and gross profit. Any per-segment EBIT or operating margin model must be an allocation assumption.
- FSD, Robotaxi, Cybercab, Optimus and Semi historical dollar revenue are not separately disclosed. Services and other includes several items, and management says Robotaxi costs are included there, but no standalone revenue or cost line is available.
- Energy product split is not dollar-disclosed by Megapack, Powerwall, Solar Roof or Megablock. Energy revenue is disclosed as one line, while storage deployment GWh is the main operational KPI.
- Tesla IR Q2 2025 PDF direct fetch from `https://www.tesla.com/sites/default/files/downloads/TSLA-Q2-2025-Update.pdf` returned Access Denied on the first call and identical retry. The official Q2 2025 SEC 8-K Exhibit 99.1 was fetched live from EDGAR and used instead.
- FMP `financial-reports-form-10-q-json` for FY2026 Q1 returned HTTP 404 on the first call and identical retry. Official SEC Q1 2026 10-Q HTML/PDF and FMP financial-statement endpoints were used; no warehouse cache was substituted.
- FMP net income line treatment differs in Q1 2026 versus official NI attributable to common as logged in the quant foundation. QF controls for TTM net income and EPS.

- Capex presentation changed in Tesla update decks beginning Q1 2025 to include purchases of energy generation and storage systems and prior periods were adjusted. This file follows the FMP cash-flow line and QF treatment, but downstream FCF bridges should preserve the note.
- Management quotes are from FMP transcripts fetched live in this run. FMP transcripts can contain transcription spelling variants for names and occasional rough punctuation; use the date field and quote context for verification.

Source notes and self-verification

Raw files written this run include FMP statement, segmentation, metrics, quote and transcript JSON files plus official SEC/IR files under `raw/`. The three mandatory spot checks passed in this run: (1) Q1 2026 official update text contains total automotive revenues line showing $16.234B and 16% YoY; (2) FMP Q1 2026 transcript has date `2026-04-22` and contains the Megapack demand quote used above; (3) FMP annual income statement FY2025 revenue equals $94.827B, tying to the FY2025 10-K within 1%.