UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2022
OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from _____ to _____

Commission File Number: 001-34756

Tesla, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**91-2197729**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
1 Tesla Road Austin, Texas	**78725**
(Address of principal executive offices)	**(Zip Code)**

(512) 516-8177
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common stock	TSLA	The Nasdaq Global Select Market

Securities registered pursuant to Section 12(g) of the Act:
None

Indicate by check mark whether the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 ("Exchange Act") during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
Emerging growth company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the Registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of voting stock held by non-affiliates of the registrant, as of June 30, 2022, the last day of the registrant's most recently completed second fiscal quarter, was $580.48 billion (based on the closing price for shares of the registrant's Common Stock as reported by the NASDAQ Global Select Market on June 30, 2022). Shares of Common Stock held by each executive officer, director, and holder of 5% or more of the outstanding Common Stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of January 25, 2023, there were 3,164,102,701 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement for the 2023 Annual Meeting of Stockholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2022.

TESLA, INC.

ANNUAL REPORT ON FORM 10-K FOR THE YEAR ENDED DECEMBER 31, 2022

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Forward-Looking Statements

The discussions in this Annual Report on Form 10-K contain forward-looking statements reflecting our current expectations that involve risks and uncertainties. These forward-looking statements include, but are not limited to, statements concerning any potential future impact of the coronavirus disease ("COVID-19") pandemic on our business, supply chain constraints, our strategy, competition, future operations and production capacity, future financial position, future revenues, projected costs, profitability, expected cost reductions, capital adequacy, expectations regarding demand and acceptance for our technologies, growth opportunities and trends in the markets in which we operate, prospects and plans and objectives of management. The words "anticipates," "believes," "could," "estimates," "expects," "intends," "may," "plans," "projects," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements that we make. These forward-looking statements involve risks and uncertainties that could cause our actual results to differ materially from those in the forward-looking statements, including, without limitation, the risks set forth in Part I, Item 1A, "Risk Factors" in this Annual Report on Form 10-K and in our other filings with the Securities and Exchange Commission (the "SEC"). We do not assume any obligation to update any forward-looking statements.

PART I

ITEM 1. BUSINESS

Overview

We design, develop, manufacture, sell and lease high-performance fully electric vehicles and energy generation and storage systems, and offer services related to our products. We generally sell our products directly to customers, and continue to grow our customer-facing infrastructure through a global network of vehicle service centers, Mobile Service, body shops, Supercharger stations and Destination Chargers to accelerate the widespread adoption of our products. We emphasize performance, attractive styling and the safety of our users and workforce in the design and manufacture of our products and are continuing to develop full self-driving technology for improved safety. We also strive to lower the cost of ownership for our customers through continuous efforts to reduce manufacturing costs and by offering financial and other services tailored to our products.

Our mission is to accelerate the world's transition to sustainable energy. We believe that this mission, along with our engineering expertise, vertically integrated business model and focus on user experience differentiate us from other companies.

Segment Information

We operate as two reportable segments: (i) automotive and (ii) energy generation and storage.

The automotive segment includes the design, development, manufacturing, sales and leasing of high-performance fully electric vehicles as well as sales of automotive regulatory credits. Additionally, the automotive segment also includes services and other, which includes non-warranty after-sales vehicle services and parts, sales of used vehicles, retail merchandise, paid Supercharging and vehicle insurance revenue. The energy generation and storage segment includes the design, manufacture, installation, sales and leasing of solar energy generation and energy storage products and related services and sales of solar energy systems incentives.

Our Products and Services

Automotive

We currently manufacture four different consumer vehicles – the Model 3, Y, S and X. Model 3 is a four-door mid-size sedan that we designed for manufacturability with a base price for mass-market appeal. Model Y is a compact sport utility vehicle ("SUV") built on the Model 3 platform with seating for up to seven adults. Model S is a four-door full-size sedan and Model X is a mid-size SUV with seating for up to seven adults. Model S and Model X feature the highest performance characteristics and longest ranges that we offer in a sedan and SUV, respectively.

In December 2022, we began early production and deliveries of the Tesla Semi, our first commercial electric vehicle. We have also announced several planned electric vehicles to address additional vehicle markets, including specialized consumer electric vehicles in Cybertruck and the new Tesla Roadster. We plan to continue leveraging developments in our proprietary Full Self-Driving ("FSD"), battery cell and other technologies.

Energy Generation and Storage

Energy Storage Products

Powerwall and Megapack are our lithium-ion battery energy storage products. Powerwall is designed to store energy at a home or small commercial facility. Megapack is an energy storage solution for commercial, industrial, utility and energy generation customers, multiple of which may be grouped together to form larger installations of gigawatt hours ("GWh") or greater capacity.

We also continue to develop software capabilities for remotely controlling and dispatching our energy storage systems across a wide range of markets and applications, including through our real-time energy control and optimization platforms.

Solar Energy Offerings

We sell retrofit solar energy systems to customers and channel partners and also make them available through power purchase agreement ("PPA") arrangements. We purchase most of the components for our retrofit solar energy systems from multiple sources to ensure competitive pricing and adequate supply. We also design and manufacture certain components for our solar energy products.

We sell our Solar Roof, which combines premium glass roof tiles with energy generation, directly to customers, as well as through channel customers. We continue to improve our installation capability and efficiency, including through collaboration with real estate developers and builders on new homes.

Technology

Automotive

Battery and Powertrain

Our core vehicle technology competencies include powertrain engineering and manufacturing and our ability to design vehicles that utilize the unique advantages of an electric powertrain. We have designed our proprietary powertrain systems to be adaptable, efficient, reliable and cost-effective while withstanding the rigors of an automotive environment. We offer dual motor powertrain vehicles, which use two electric motors to maximize traction and performance in an all-wheel drive configuration, as well as vehicle powertrain technology featuring three electric motors for further increased performance in certain versions of Model S and Model X and the Tesla Semi.

We maintain extensive testing and R&D capabilities for battery cells, packs and systems, and have built an expansive body of knowledge on lithium-ion cell chemistry types and performance characteristics. In order to enable a greater supply of cells for our products with higher energy density at lower costs, we have developed a new proprietary lithium-ion battery cell and improved manufacturing processes.

Vehicle Control and Infotainment Software

The performance and safety systems of our vehicles and their battery packs utilize sophisticated control software. Control systems in our vehicles optimize performance, customize vehicle behavior, manage charging and control all infotainment functions. We develop almost all of this software, including most of the user interfaces, internally and update our vehicles' software regularly through over-the-air updates.

Self-Driving Development and Artificial Intelligence

We have expertise in developing technologies, systems and software to enable self-driving vehicles using primarily vision-based technologies. Our FSD Computer runs our neural networks in our vehicles, and we are also developing additional computer hardware to better enable the massive amounts of field data captured by our vehicles to continually train and improve these neural networks for real-world performance.

Currently, we offer in our vehicles certain advanced driver assist systems under our Autopilot and FSD options. Although at present the driver is ultimately responsible for controlling the vehicle, our systems provide safety and convenience functionality that relieves drivers of the most tedious and potentially dangerous aspects of road travel much like the system that airplane pilots use, when conditions permit. As with other vehicle systems, we improve these functions in our vehicles over time through over-the-air updates.

We intend to establish in the future an autonomous Tesla ride-hailing network, which we expect would also allow us to access a new customer base even as modes of transportation evolve.

We are also applying our artificial intelligence learnings from self-driving technology to the field of robotics. For example, in 2022 we previewed Optimus, a robotic humanoid which is controlled by the same AI system.

Energy Generation and Storage

Energy Storage Products

We leverage many of the component-level technologies from our vehicles in our energy storage products. By taking a modular approach to the design of battery systems, we can optimize manufacturing capacity of our energy storage products. Additionally, our expertise in power electronics enables our battery systems to interconnect with electricity grids while providing fast-acting systems for power injection and absorption. We have also developed software to remotely control and dispatch our energy storage systems.

Solar Energy Systems

We have engineered Solar Roof over numerous iterations to combine aesthetic appeal and durability with power generation. The efficiency of our solar energy products is aided by our own solar inverter, which incorporates our power electronics technologies. We designed both products to integrate with Powerwall.

Design and Engineering

Automotive

We have established significant in-house capabilities in the design and test engineering of electric vehicles and their components and systems. Our team has significant experience in computer-aided design as well as durability, strength and crash test simulations, which reduces the product development time of new models. We have also achieved complex engineering feats in stamping, casting and thermal systems, and developed a method to integrate batteries directly with vehicle body structures without separate battery packs to optimize manufacturability, weight, range and cost characteristics.

We are also expanding our manufacturing operations globally while taking action to localize our vehicle designs and production for particular markets, including country-specific market demands and factory optimizations for local workforces. As we increase our capabilities, particularly in the areas of automation, die-making and line-building, we are also making strides in the simulations modeling these capabilities prior to construction.

Energy Generation and Storage

Our expertise in electrical, mechanical, civil and software engineering allows us to design, engineer, manufacture and install energy generating and storage products and components, including at the residential through utility scale. For example, the modular design of our Megapack utility-scale battery line is intended to significantly reduce the amount of assembly required in the field. We also customize solutions including our energy storage products, solar energy systems and/or Solar Roof for customers to meet their specific needs.

Sales and Marketing

Historically, we have been able to generate significant media coverage of our company and our products, and we believe we will continue to do so. Such media coverage and word of mouth are the current primary drivers of our sales leads and have helped us achieve sales without traditional advertising and at relatively low marketing costs.

Automotive

Direct Sales

Our vehicle sales channels currently include our website and an international network of company-owned stores. In some jurisdictions, we also have galleries to educate and inform customers about our products, but such locations do not transact in the sale of vehicles. We believe this infrastructure enables us to better control costs of inventory, manage warranty service and pricing, educate consumers about electric vehicles, maintain and strengthen the Tesla brand and obtain rapid customer feedback.

We reevaluate our sales strategy both globally and at a location-by-location level from time to time to optimize our sales channels. However, sales of vehicles in the automobile industry tend to be cyclical in many markets, which may expose us to volatility from time to time.

Used Vehicle Sales

Our used vehicle business supports new vehicle sales by integrating the trade-in of a customer’s existing Tesla or non-Tesla vehicle with the sale of a new or used Tesla vehicle. The Tesla and non-Tesla vehicles we acquire as trade-ins are subsequently remarketed, either directly by us or through third parties. We also remarket used Tesla vehicles acquired from other sources including lease returns.

Public Charging

We have a growing global network of Tesla Superchargers, which are our industrial-grade, high-speed vehicle chargers. Where possible, we co-locate Superchargers with our solar and energy storage systems to reduce costs and promote renewable power. Supercharger stations are typically placed along well-traveled routes and in and around dense city centers to allow vehicle owners the ability to enjoy quick, reliable charging along an extensive network with convenient stops. Use of the Supercharger network either requires payment of a fee or is free under certain sales programs. In November 2021, we began to offer Supercharger access to non-Tesla vehicles in certain locations in support of our mission to accelerate the world’s transition to sustainable energy.

We also work with a wide variety of hospitality, retail and public destinations, as well as businesses with commuting employees, to offer additional charging options for our customers, as well as single-family homeowners and multi-family residential entities, to deploy home charging solutions.

In-App Upgrades

As our vehicles are capable of being updated remotely over-the-air, our customers may purchase additional paid options and features through the Tesla app or through the in-vehicle user interface. We expect that this functionality will also allow us to offer certain options and features on a subscription basis in the future.

Energy Generation and Storage

We market and sell our solar and energy storage products to residential, commercial and industrial customers and utilities through a variety of channels, including through our website, stores and galleries, as well as through our network of channel partners, and in the case of some commercial customers, through PPA transactions. We emphasize simplicity, standardization and accessibility to make it easy and cost-effective for customers to adopt clean energy, while reducing our customer acquisition costs.

Service and Warranty

Automotive

Service

We provide service for our electric vehicles at our company-owned service locations and through Tesla Mobile Service technicians who perform work remotely at customers' homes or other locations. Performing vehicle service ourselves allows us to identify problems and implement solutions and improvements faster, and optimize logistics and inventory better, than traditional automobile manufacturers and their dealer networks. The connectivity of our vehicles also allows us to diagnose and remedy many problems remotely and proactively.

Vehicle Limited Warranties and Extended Service Plans

We provide a manufacturer's limited warranty on all new and used Tesla vehicles we sell, which may include separate limited warranties on certain components, specific types of damage or battery capacity retention. We also currently offer extended service plans that provide coverage beyond the new vehicle limited warranties for certain models in specified regions.

Energy Generation and Storage

We provide service and repairs to our energy product customers, including under warranty where applicable. We generally provide manufacturer's limited warranties with our energy storage products and offer certain extended limited warranties that are available at the time of purchase of the system. If we install a system, we also provide certain limited warranties on our installation workmanship.

For retrofit solar energy systems, we provide separate limited warranties for workmanship and against roof leaks, and for Solar Roof, we also provide limited warranties for defects and weatherization. For components not manufactured by us, we generally pass-through the applicable manufacturers' warranties.

As part of our solar energy system and energy storage contracts, we may provide the customer with performance guarantees that commit that the underlying system will meet or exceed the minimum energy generation or performance requirements specified in the contract.

Financial Services

Automotive

Purchase Financing and Leases

We offer leasing and/or loan financing arrangements for our vehicles in certain jurisdictions in North America, Europe and Asia ourselves and through various financial institutions. Under certain of such programs, we have provided resale value guarantees or buyback guarantees that may obligate us to repurchase the subject vehicles at pre-determined values.

Insurance

In 2021, we launched our insurance product using real-time driving behavior in select states, which offers rates that are often better than other alternatives and promotes safer driving. Our insurance products are currently available in 12 states and we plan to expand the markets in which we offer insurance products, as part of our ongoing effort to decrease the total cost of ownership for our customers.

Energy Generation and Storage

We offer certain financing options to our solar customers, which enable the customer to purchase and own a solar energy system, Solar Roof or integrated solar and Powerwall system. Our solar PPAs, offered primarily to commercial customers, charge a fee per kilowatt-hour based on the amount of electricity produced by our solar energy systems.

Manufacturing

We currently have manufacturing facilities in the US in Northern California, in Buffalo, New York, Gigafactory New York; in Austin, Texas, Gigafactory Texas and near Reno, Nevada, Gigafactory Nevada. At these facilities, we manufacture and assemble, among other things, vehicles, certain vehicle parts and components, such as our battery packs and battery cells, energy storage components and solar products and components.

Internationally, we also have manufacturing facilities in China (Gigafactory Shanghai) and Germany (Gigafactory Berlin-Brandenburg), which allows us to increase the affordability of our vehicles for customers in local markets by reducing transportation and manufacturing costs and eliminating the impact of unfavorable tariffs. Generally, we continue to expand production capacity at our existing facilities. We also intend to further increase cost-competitiveness in our significant markets by strategically adding local manufacturing.

Supply Chain

Our products use thousands of parts that are sourced from hundreds of suppliers across the world. We have developed close relationships with vendors of key parts such as battery cells, electronics and complex vehicle assemblies. Certain components purchased from these suppliers are shared or are similar across many product lines, allowing us to take advantage of pricing efficiencies from economies of scale.

As is the case for some automotive companies, some of our procured components and systems are sourced from single suppliers. Where multiple sources are available for certain key components, we work to qualify multiple suppliers for them where it is sensible to do so in order to minimize potential production risks due to disruptions in their supply. We also mitigate risk by maintaining safety stock for key parts and assemblies and die banks for components with lengthy procurement lead times.

Our products use various raw materials including aluminum, steel, cobalt, lithium, nickel and copper. Pricing for these materials is governed by market conditions and may fluctuate due to various factors outside of our control, such as supply and demand and market speculation. We strive to execute long-term supply contracts for such materials at competitive pricing when feasible, and we currently believe that we have adequate access to raw materials supplies to meet the needs of our operations.

Governmental Programs, Incentives and Regulations

Globally, the ownership of our products by our customers is impacted by various government credits, incentives, and policies. Our business and products are also subject to numerous governmental regulations that vary among jurisdictions.

The operation of our business is also impacted by various government programs, incentives, and other arrangements. See Note 2, *Summary of Significant Accounting Policies*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for further details.

Programs and Incentives

Inflation Reduction Act

On August 16, 2022, the Inflation Reduction Act of 2022 (“IRA”) was enacted into law and is effective for taxable years beginning after December 31, 2022, and remains subject to future guidance releases. The IRA includes multiple incentives to promote clean energy, electric vehicles, battery and energy storage manufacture or purchase, including through providing tax credits to consumers. For example, qualifying Tesla customers may receive up to $7,500 in federal tax credits for the purchase of qualified electric vehicles in the U.S through 2032.

Automotive Regulatory Credits

We earn tradable credits in the operation of our business under various regulations related to zero-emission vehicles (“ZEVs”), greenhouse gas, fuel economy and clean fuel. We sell these credits to other regulated entities who can use the credits to comply with emission standards and other regulatory requirements. Sales of these credits are recognized within automotive regulatory credits revenue in our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Energy Storage System Incentives and Policies

While the regulatory regime for energy storage projects is still under development, there are various policies, incentives and financial mechanisms at the federal, state and local levels that support the adoption of energy storage.

For example, energy storage systems that are charged using solar energy may be eligible for the solar energy-related U.S. federal tax credits described below. The Federal Energy Regulatory Commission ("FERC") has also taken steps to enable the participation of energy storage in wholesale energy markets. In addition, California and a number of other states have adopted procurement targets for energy storage, and behind-the-meter energy storage systems qualify for funding under the California Self Generation Incentive Program. Our customers primarily benefit directly under these programs. In certain instances our customers may transfer such credits to us as contract consideration. In such transactions, they are included as a component of energy generation and storage revenues in our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Pursuant to the IRA, under Sections 48, 48E and 25D of the Internal Revenue Code ("IRC"), standalone energy storage technology is eligible for a tax credit between 6% and 50% of qualified expenditures, regardless of the source of energy, which may be claimed by our customers for storage systems they purchase or by us for arrangements where we own the systems. These tax credits are primarily for the benefit of our customers and are currently scheduled to phase-out starting in 2032 or later.

Solar Energy System Incentives and Policies

U.S. federal, state and local governments have established various policies, incentives and financial mechanisms to reduce the cost of solar energy and to accelerate the adoption of solar energy. These incentives include tax credits, cash grants, tax abatements and rebates.

In particular, pursuant to the IRA, Sections 48, 48E and 25D of the IRC provides a tax credit between 6% and 70% of qualified commercial or residential expenditures for solar energy systems, which may be claimed by our customers for systems they purchase, or by us for arrangements where we own the systems for properties that meet statutory requirements. These tax credits are primarily for the direct benefit of our customers and are currently scheduled to phase-out starting in 2023 or later.

Regulations

Vehicle Safety and Testing

In the U.S., our vehicles are subject to regulation by the National Highway Traffic Safety Administration ("NHTSA"), including all applicable Federal Motor Vehicle Safety Standards ("FMVSS") and the NHTSA bumper standard. Numerous FMVSS apply to our vehicles, such as crash-worthiness and occupant protection requirements. Our current vehicles fully comply and we expect that our vehicles in the future will fully comply with all applicable FMVSS with limited or no exemptions, however, FMVSS are subject to change from time to time. As a manufacturer, we must self-certify that our vehicles meet all applicable FMVSS and the NHTSA bumper standard, or otherwise are exempt, before the vehicles may be imported or sold in the U.S.

We are also required to comply with other federal laws administered by NHTSA, including the Corporate Average Fuel Economy standards, Theft Prevention Act requirements, labeling requirements and other information provided to customers in writing, Early Warning Reporting requirements regarding warranty claims, field reports, death and injury reports and foreign recalls, a Standing General Order requiring reports regarding crashes involving vehicles equipped with advanced driver assistance systems, and additional requirements for cooperating with compliance and safety investigations and recall reporting. The U.S. Automobile Information and Disclosure Act also requires manufacturers of motor vehicles to disclose certain information regarding the manufacturer's suggested retail price, optional equipment and pricing. In addition, federal law requires inclusion of fuel economy ratings, as determined by the U.S. Department of Transportation and the Environmental Protection Agency (the "EPA"), and New Car Assessment Program ratings as determined by NHTSA, if available.

Our vehicles sold outside of the U.S. are subject to similar foreign compliance, safety, environmental and other regulations. Many of those regulations are different from those applicable in the U.S. and may require redesign and/or retesting. Some of those regulations impact or prevent the rollout of new vehicle features. Additionally, the European Union established new rules regarding additional compliance oversight that commenced in 2020.

Self-Driving Vehicles

Generally, laws pertaining to self-driving vehicles are evolving globally, and in some cases may create restrictions on features that we develop. While there are currently no federal U.S. regulations pertaining specifically to self-driving vehicles or self-driving equipment, NHTSA has published recommended guidelines on self-driving vehicles, apart from the FMVSS and manufacturer reporting obligations, and retains the authority to investigate and/or take action on the safety or compliance of any vehicle, equipment or features operating on public roads. Certain U.S. states also have legal restrictions on the operation, registration or licensure of self-driving vehicles, and many other states are considering them. This regulatory patchwork increases the legal complexity with respect to self-driving vehicles in the U.S.

In markets that follow the regulations of the United Nations Economic Commission for Europe, some requirements restrict the design of advanced driver-assistance or self-driving features, which can compromise or prevent their use entirely. Other applicable laws, both current and proposed, may hinder the path and timeline to introducing self-driving vehicles for sale and use in the markets where they apply.

Other key markets, including China, continue to consider self-driving regulation. Any implemented regulations may differ materially from those in the U.S. and Europe, which may further increase the legal complexity of self-driving vehicles and limit or prevent certain features.

Automobile Manufacturer and Dealer Regulation

In the U.S., state laws regulate the manufacture, distribution, sale and service of automobiles, and generally require motor vehicle manufacturers and dealers to be licensed in order to sell vehicles directly to residents. Certain states have asserted that the laws in such states do not permit automobile manufacturers to be licensed as dealers or to act in the capacity of a dealer, or that they otherwise restrict a manufacturer's ability to deliver or perform warranty repairs on vehicles. To sell vehicles to residents of states where we are not licensed as a dealer, we generally conduct the sale out of the state. In certain such states, we have opened "galleries" that serve an educational purpose and where sales may not occur.

Some automobile dealer trade associations have both challenged the legality of our operations in court and used administrative and legislative processes to attempt to prohibit or limit our ability to operate existing stores or expand to new locations. Certain dealer associations have also actively lobbied state licensing agencies and legislators to interpret existing laws or enact new laws in ways not favorable to our ownership and operation of our own retail and service locations. We expect such challenges to continue, and we intend to actively fight any such efforts.

Battery Safety and Testing

Our battery packs are subject to various U.S. and international regulations that govern transport of "dangerous goods," defined to include lithium-ion batteries, which may present a risk in transportation. We conduct testing to demonstrate our compliance with such regulations.

We use lithium-ion cells in our high voltage battery packs in our vehicles and energy storage products. The use, storage and disposal of our battery packs are regulated under existing laws and are the subject of ongoing regulatory changes that may add additional requirements in the future. We have agreements with third party battery recycling companies to recycle our battery packs, and we are also piloting our own recycling technology.

Solar Energy—General

We are subject to certain state and federal regulations applicable to solar and battery storage providers and sellers of electricity. To operate our systems, we enter into standard interconnection agreements with applicable utilities. Sales of electricity and non-sale equipment leases by third parties, such as our leases and PPAs, have faced regulatory challenges in some states and jurisdictions.

Solar Energy—Net Metering

Most states in the U.S. make net energy metering, or net metering, available to solar customers. Net metering typically allows solar customers to interconnect their solar energy systems to the utility grid and offset their utility electricity purchases by receiving a bill credit for excess energy generated by their solar energy system that is exported to the grid. In certain jurisdictions, regulators or utilities have reduced or eliminated the benefit available under net metering or have proposed to do so.

Competition

Automotive

The worldwide automotive market is highly competitive and we expect it will become even more competitive in the future as we introduce additional vehicles in a broader cross-section of the passenger and commercial vehicle market and expand our vehicles' capabilities.

We believe that our vehicles compete in the market based on both their traditional segment classification as well as their propulsion technology. For example, Model S and Model X compete primarily with premium sedans and premium SUVs and Model 3 and Model Y compete with small to medium-sized sedans and compact SUVs, which are extremely competitive markets. Competing products typically include internal combustion vehicles from more established automobile manufacturers; however, many established and new automobile manufacturers have entered or have announced plans to enter the market for electric and other alternative fuel vehicles. Overall, we believe these announcements and vehicle introductions, including the introduction of electric vehicles into rental car company fleets, promote the development of the electric vehicle market by highlighting the attractiveness of electric vehicles relative to the internal combustion vehicle. Many major automobile manufacturers have electric vehicles available today in major markets including the U.S., China and Europe, and other current and prospective automobile manufacturers are also developing electric vehicles. In addition, several manufacturers offer hybrid vehicles, including plug-in versions.

We believe that there is also increasing competition for our vehicle offerings as a platform for delivering self-driving technologies, charging solutions and other features and services, and we expect to compete in this developing market through continued progress on our Autopilot, FSD and neural network capabilities, Supercharger network and our infotainment offerings.

Energy Generation and Storage

Energy Storage Systems

The market for energy storage products is also highly competitive, and both established and emerging companies have introduced products that are similar to our product portfolio or that are alternatives to the elements of our systems. We compete with these companies based on price, energy density and efficiency. We believe that the specifications and features of our products, our strong brand and the modular, scalable nature of our energy storage products give us a competitive advantage in our markets.

Solar Energy Systems

The primary competitors to our solar energy business are the traditional local utility companies that supply energy to our potential customers. We compete with these traditional utility companies primarily based on price and the ease by which customers can switch to electricity generated by our solar energy systems. We also compete with solar energy companies that provide products and services similar to ours. Many solar energy companies only install solar energy systems, while others only provide financing for these installations. We believe we have a significant expansion opportunity with our offerings and that the regulatory environment is increasingly conducive to the adoption of renewable energy systems.

Intellectual Property

We place a strong emphasis on our innovative approach and proprietary designs which bring intrinsic value and uniqueness to our product portfolio. As part of our business, we seek to protect the underlying intellectual property rights of these innovations and designs such as with respect to patents, trademarks, copyrights, trade secrets and other measures, including through employee and third-party nondisclosure agreements and other contractual arrangements. For example, we place a high priority on obtaining patents to provide the broadest and strongest possible protection to enable our freedom to operate our innovations and designs within our products and technologies in the electric vehicle market as well as to protect and defend our product portfolio. We have also adopted a patent policy in which we irrevocably pledged that we will not initiate a lawsuit against any party for infringing our patents through activity relating to electric vehicles or related equipment for so long as such party is acting in good faith. We made this pledge in order to encourage the advancement of a common, rapidly-evolving platform for electric vehicles, thereby benefiting ourselves, other companies making electric vehicles and the world.

Environmental, Social and Governance (ESG) and Human Capital Resources

ESG

The very purpose of Tesla's existence is to accelerate the world's transition to sustainable energy. We believe the world cannot reduce carbon emissions without addressing both energy generation and consumption, and we are designing and manufacturing a complete energy and transportation ecosystem to achieve this goal. As we expand, we are building each new factory to be more efficient and sustainably designed than the previous one, including with respect to per-unit waste reduction and resource consumption, including water and energy usage. We are focused on further enhancing sustainability of operations outside of our direct control, including reducing the carbon footprint of our supply chain.

We are committed to sourcing only responsibly produced materials, and our suppliers are required to provide evidence of management systems that ensure social, environmental and sustainability best practices in their own operations, as well as to demonstrate a commitment to responsible sourcing into their supply chains. We have a zero-tolerance policy when it comes to child or forced labor and human trafficking by our suppliers and we look to the Organization for Economic Co-operation and Development Due Diligence Guidelines to inform our process and use feedback from our internal and external stakeholders to find ways to continually improve. We are also driving safety in our own factories by focusing on worker engagement. Our incidents per vehicle continue to drop even as our production volumes increase. We also strive to be an employer of choice by offering compelling, impactful jobs with best in-industry benefits.

We believe that sound corporate governance is critical to helping us achieve our goals, including with respect to ESG. We continue to evolve a governance framework that exercises appropriate oversight of responsibilities at all levels throughout the company and manages its affairs consistent with high principles of business ethics. Our ESG Sustainability Council is made up of leaders from across our company, and regularly presents to our Board of Directors, which oversees our ESG impacts, initiatives and priorities.

Human Capital Resources

Our greatest asset is our people and we continue to attract the best and brightest with our competitive pay and benefits package which starts with ownership. We offer employees the opportunity to receive equity during their employment and share in the success of Tesla. As of December 31, 2022, our full-time count for our and our subsidiaries' employees worldwide was 127,855, a 29,000 year over year increase.

We are committed to providing a workplace where our employees feel respected and appreciated. Human Resource ("HR") Partners for each functional area are introduced in new hire orientation so employees know whom to contact with questions or concerns. HR Partners are visible throughout facilities and are actively involved in driving culture and engagement alongside business leaders.

Our policies are designed to promote fairness and respect for everyone. We hire, evaluate, and promote employees based on their skills and performance. Everyone is expected to be trustworthy, demonstrate excellence in their performance, and collaborate with others. With this in mind, we will not tolerate certain behaviors. These include harassment, retaliation, violence, intimidation, and discrimination of any kind on the basis of race, color, religion, national origin, gender, sexual orientation, gender identity, gender expression, age, disability or veteran status.

To ensure this, anti-harassment training is conducted on day one of new hire orientation for all employees. In addition, we run various leadership development programs throughout the year aimed at enhancing leaders' skills, and in particular, helping them to understand how to appropriately respond to employee concerns.

Through our *See Something, Say Something* program, employees are encouraged to speak up both in regard to misconduct and safety concerns. They can do so by contacting the integrity line, submitting concerns through our Take Charge process, or notifying their HR Partner or any member of management. Concerns are reviewed in accordance with established protocols by investigators with expertise, who also review for trends and outcomes for remediation and appropriate controls.

Responding to questions timely is key so we implemented HR Answer Bars in the factories where employees can easily access and speak with an HR representative immediately regarding career advice, benefits or any concerns the employee may have. We have also implemented an HR Chatbot for 24x7 answers to team members' questions.

To continue innovating and changing the world for the better, we must ensure we have a talented and engaged workforce with ample opportunity to contribute to our mission and grow professionally. We are focused on intentionally creating pathways to career opportunities across Tesla through strategic initiatives such as:

- **Internships and Apprenticeships** - Over 3,000 university and community college students from around the world are hired into internship and apprenticeship opportunities at Tesla annually. We recruit from over 100 collegiate institutions and diverse student organizations, attracting top talent passionate about accelerating the world's transition to sustainable energy.
- **Tesla START** - Tesla START is an intensive training program providing individuals with the skills necessary for a successful technician role at Tesla. We partner with 13 colleges across the country to integrate Tesla START into automotive, collision and manufacturing curriculums to provide individuals with a smooth transition from college to full-time employment. In 2022, we had over 200 graduates from Tesla START programs, with an additional 100+ graduating in the coming weeks from our winter classes.
- **High School Graduate Pathways -** Tesla's Manufacturing Development Program is designed to provide graduating high school seniors with the financial resources, coursework and experience they need to start a successful manufacturing career at Tesla. We hired 144 graduates through this program in 2022, and our goal in 2023 is to grow this program 2.5X to over 360 students annually across our Fremont Factory, Gigafactory Nevada, Gigafactory Texas, and Gigafactory New York.

At Tesla, our employees show up passionate about making a difference in the world and for each other. With a majority-minority workforce, empowering our employee resource groups to take charge in driving initiatives that attract, develop and retain our passionate workforce is vital to our continued success.

Available Information

We file or furnish periodic reports and amendments thereto, including our Annual Reports on Form 10-K, our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, proxy statements and other information with the SEC. In addition, the SEC maintains a website (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically. Our website is located at www.tesla.com, and our reports, amendments thereto, proxy statements and other information are also made available, free of charge, on our investor relations website at ir.tesla.com as soon as reasonably practicable after we electronically file or furnish such information with the SEC. The information posted on our website is not incorporated by reference into this Annual Report on Form 10-K.

ITEM 1A. RISK FACTORS

You should carefully consider the risks described below together with the other information set forth in this report, which could materially affect our business, financial condition and future results. The risks described below are not the only risks facing our company. Risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition and operating results.

Risks Related to Our Ability to Grow Our Business

We may be impacted by macroeconomic conditions resulting from the global COVID-19 pandemic.

Since the first quarter of 2020, there has been a worldwide impact from the COVID-19 pandemic. Government regulations and shifting social behaviors have, at times, limited or closed non-essential transportation, government functions, business activities and person-to-person interactions. Global trade conditions and consumer trends that originated during the pandemic continue to persist and may also have long-lasting adverse impact on us and our industries independently of the progress of the pandemic.

For example, pandemic-related issues have exacerbated port congestion and intermittent supplier shutdowns and delays, resulting in additional expenses to expedite delivery of critical parts. Similarly, increased demand for personal electronics has created a shortfall of semiconductors, which has caused challenges in our supply chain and production. In addition, labor shortages resulting from the pandemic, including worker absenteeism, has led to increased difficulty in hiring and retaining manufacturing and service workers, as well as increased labor costs and supplier delays. Sustaining our production trajectory will require the ongoing readiness and solvency of our suppliers and vendors, a stable and motivated production workforce and government cooperation, including for travel and visa allowances. The contingencies inherent in the ramp at new facilities such as Gigafactory Berlin-Brandenburg and Gigafactory Texas may be exacerbated by these challenges. Additionally, infection rates and regulations continue to fluctuate in various regions, which may impact operations. For example, in 2022, spikes in COVID-19 cases in Shanghai resulted in the temporary shutdown of Gigafactory Shanghai, as well as parts of our supply chain, and impacted our ability to deliver cars.

We cannot predict the duration or direction of current global trends or their sustained impact. Ultimately, we continue to monitor macroeconomic conditions to remain flexible and to optimize and evolve our business as appropriate, and attempt to accurately project demand and infrastructure requirements globally and deploy our production, workforce and other resources accordingly. Lastly, rising interest rates may lead to consumers to increasingly pull back spending, including on our products, which may harm our demand, business and operating results. If we experience unfavorable global market conditions, or if we cannot or do not maintain operations at a scope that is commensurate with such conditions or are later required to or choose to suspend such operations again, our business, prospects, financial condition and operating results may be harmed.

We may experience delays in launching and ramping the production of our products and features, or we may be unable to control our manufacturing costs.

We have previously experienced and may in the future experience launch and production ramp delays for new products and features. For example, we encountered unanticipated supplier issues that led to delays during the initial ramp of our first Model X and experienced challenges with a supplier and with ramping full automation for certain of our initial Model 3 manufacturing processes. In

addition, we may introduce in the future new or unique manufacturing processes and design features for our products. There is no guarantee that we will be able to successfully and timely introduce and scale such processes or features.

In particular, our future business depends in large part on increasing the production of mass-market vehicles including Model 3 and Model Y. In order to be successful, we will need to implement, maintain and ramp efficient and cost-effective manufacturing capabilities, processes and supply chains and achieve the design tolerances, high quality and output rates we have planned at our manufacturing facilities in California, Nevada, Texas, China, Germany and any future sites. We will also need to hire, train and compensate skilled employees to operate these facilities. Bottlenecks and other unexpected challenges such as those we experienced in the past may arise during our production ramps, and we must address them promptly while continuing to improve manufacturing processes and reducing costs. If we are not successful in achieving these goals, we could face delays in establishing and/or sustaining our Model 3 and Model Y ramps or be unable to meet our related cost and profitability targets.

We have experienced, and may also experience similar future delays in launching and/or ramping production of our energy storage products and Solar Roof; new product versions or variants; new vehicles; and future features and services based on artificial intelligence. Likewise, we may encounter delays with the design, construction and regulatory or other approvals necessary to build and bring online future manufacturing facilities and products.

Any delay or other complication in ramping the production of our current products or the development, manufacture, launch and production ramp of our future products, features and services, or in doing so cost-effectively and with high quality, may harm our brand, business, prospects, financial condition and operating results.

Our suppliers may fail to deliver components according to schedules, prices, quality and volumes that are acceptable to us, or we may be unable to manage these components effectively.

Our products contain thousands of parts purchased globally from hundreds of suppliers, including single-source direct suppliers, which exposes us to multiple potential sources of component shortages. Unexpected changes in business conditions, materials pricing, including inflation of raw material costs, labor issues, wars, trade policies, natural disasters, health epidemics such as the global COVID-19 pandemic, trade and shipping disruptions, port congestions and other factors beyond our or our suppliers' control could also affect these suppliers' ability to deliver components to us or to remain solvent and operational. For example, a global shortage of semiconductors has been reported since early 2021 and has caused challenges in the manufacturing industry and impacted our supply chain and production. In addition, a spike in COVID-19 cases in Shanghai in early 2022 led to temporary manufacturing shutdowns of certain of our suppliers. We have used alternative parts and programmed software to mitigate certain challenges caused by these shortages, but there is no guarantee we may be able to continually do so as we scale production to meet our growth targets. Additionally, if our suppliers do not accurately forecast and effectively allocate production or if they are not willing to allocate sufficient production to us, it may reduce our access to components and require us to search for new suppliers. The unavailability of any component or supplier could result in production delays, idle manufacturing facilities, product design changes and loss of access to important technology and tools for producing and supporting our products, as well as impact our capacity expansion and our ability to fulfill our obligations under customer contracts. Moreover, significant increases in our production, such as for Model 3 and Model Y, or product design changes by us have required and may in the future require us to procure additional components in a short amount of time. We have faced in the past, and may face suppliers who are unwilling or unable to sustainably meet our timelines or our cost, quality and volume needs, or to do so may cost us more, which may require us to replace them with other sources. Finally, we have limited vehicle manufacturing experience outside of the Fremont Factory and Gigafactory Shanghai and we may experience issues increasing the level of localized procurement at Gigafactory Berlin-Brandenburg and Gigafactory Texas. While we believe that we will be able to secure additional or alternate sources or develop our own replacements for most of our components, there is no assurance that we will be able to do so quickly or at all. Additionally, we may be unsuccessful in our continuous efforts to negotiate with existing suppliers to obtain cost reductions and avoid unfavorable changes to terms, source less expensive suppliers for certain parts and redesign certain parts to make them less expensive to produce, especially in light of the increases in materials pricing. Any of these occurrences may harm our business, prospects, financial condition and operating results.

As the scale of our vehicle production increases, we will also need to accurately forecast, purchase, warehouse and transport components at high volumes to our manufacturing facilities and servicing locations internationally. If we are unable to accurately match the timing and quantities of component purchases to our actual needs or successfully implement automation, inventory

management and other systems to accommodate the increased complexity in our supply chain and parts management, we may incur unexpected production disruption, storage, transportation and write-off costs, which may harm our business and operating results.

We may be unable to meet our projected construction timelines, costs and production ramps at new factories, or we may experience difficulties in generating and maintaining demand for products manufactured there.

Our ability to increase production of our vehicles on a sustained basis, make them affordable globally by accessing local supply chains and workforces and streamline delivery logistics is dependent on the construction and ramp of our current and future factories. The construction of and commencement and ramp of production at these factories are subject to a number of uncertainties inherent in all new manufacturing operations, including ongoing compliance with regulatory requirements, procurement and maintenance of construction, environmental and operational licenses and approvals for additional expansion, supply chain constraints, hiring, training and retention of qualified employees and the pace of bringing production equipment and processes online with the capability to manufacture high-quality units at scale. Moreover, we will have to establish and ramp production of our proprietary battery cells and packs at our new factories, and we additionally intend to incorporate sequential design and manufacturing changes into vehicles manufactured at each new factory. If we experience any issues or delays in meeting our projected timelines, costs, capital efficiency and production capacity for our new factories, expanding and managing teams to implement iterative design and production changes there, maintaining and complying with the terms of any debt financing that we obtain to fund them or generating and maintaining demand for the vehicles we manufacture there, our business, prospects, operating results and financial condition may be harmed.

We may be unable to grow our global product sales, delivery and installation capabilities and our servicing and vehicle charging networks, or we may be unable to accurately project and effectively manage our growth.

Our success will depend on our ability to continue to expand our sales capabilities. We are targeting with Model 3 and Model Y a global mass demographic with a broad range of potential customers, in which we have relatively limited experience projecting demand and pricing our products. We currently produce numerous international variants at a limited number of factories, and if our specific demand expectations for these variants prove inaccurate, we may not be able to timely generate deliveries matched to the vehicles that we produce in the same timeframe or that are commensurate with the size of our operations in a given region. Likewise, as we develop and grow our energy products and services worldwide, our success will depend on our ability to correctly forecast demand in various markets.

Because we do not have independent dealer networks, we are responsible for delivering all of our vehicles to our customers. As our production volumes continue to grow, we have faced in the past, and may face challenges with deliveries at increasing volumes, particularly in international markets requiring significant transit times. We have also deployed a number of delivery models, such as deliveries to customers' homes and workplaces and touchless deliveries, but there is no guarantee that such models will be scalable or be accepted globally. Likewise, as we ramp our energy products, we are working to substantially increase our production and installation capabilities. If we experience production delays or inaccurately forecast demand, our business, financial condition and operating results may be harmed.

Moreover, because of our unique expertise with our vehicles, we recommend that our vehicles be serviced by us or by certain authorized professionals. If we experience delays in adding servicing capacity or servicing our vehicles efficiently, or experience unforeseen issues with the reliability of our vehicles, particularly higher-volume additions to our fleet such as Model 3 and Model Y, it could overburden our servicing capabilities and parts inventory. Similarly, the increasing number of Tesla vehicles also requires us to continue to rapidly increase the number of our Supercharger stations and connectors throughout the world.

There is no assurance that we will be able to ramp our business to meet our sales, delivery, installation, servicing and vehicle charging targets globally, that our projections on which such targets are based will prove accurate or that the pace of growth or coverage of our customer infrastructure network will meet customer expectations. These plans require significant cash investments and management resources and there is no guarantee that they will generate additional sales or installations of our products, or that we will be able to avoid cost overruns or be able to hire additional personnel to support them. As we expand, we will also need to ensure our compliance with regulatory requirements in various jurisdictions applicable to the sale, installation and servicing of our products, the sale or dispatch of electricity related to our energy products and the operation of Superchargers. If we fail to manage our growth effectively, it may harm our brand, business, prospects, financial condition and operating results.

We will need to maintain and significantly grow our access to battery cells, including through the development and manufacture of our own cells, and control our related costs.

We are dependent on the continued supply of lithium-ion battery cells for our vehicles and energy storage products, and we will require substantially more cells to grow our business according to our plans. Currently, we rely on suppliers such as Panasonic and Contemporary Amperex Technology Co. Limited (CATL) for these cells. We have to date fully qualified only a very limited number of such suppliers and have limited flexibility in changing suppliers. Any disruption in the supply of battery cells from our suppliers could limit production of our vehicles and energy storage products. In the long term, we intend to supplement cells from our suppliers with cells manufactured by us, which we believe will be more efficient, manufacturable at greater volumes and more cost-effective

than currently available cells. However, our efforts to develop and manufacture such battery cells have required, and may continue to require, significant investments, and there can be no assurance that we will be able to achieve these targets in the timeframes that we have planned or at all. If we are unable to do so, we may have to curtail our planned vehicle and energy storage product production or procure additional cells from suppliers at potentially greater costs, either of which may harm our business and operating results.

In addition, the cost and mass production of battery cells, whether manufactured by our suppliers or by us, depends in part upon the prices and availability of raw materials such as lithium, nickel, cobalt and/or other metals. The prices for these materials fluctuate and their available supply may be unstable, depending on market conditions and global demand for these materials. For example, as a result of increased global production of electric vehicles and energy storage products, suppliers of these raw materials may be unable to meet our volume needs. Additionally, our suppliers may not be willing or able to reliably meet our timelines or our cost and quality needs, which may require us to replace them with other sources. Any reduced availability of these materials may impact our access to cells and our growth, and any increases in their prices may reduce our profitability if we cannot recoup such costs through increased prices. Moreover, our inability to meet demand and any product price increases may harm our brand, growth, prospects and operating results.

Our future growth and success are dependent upon consumers' demand for electric vehicles and specifically our vehicles in an automotive industry that is generally competitive, cyclical and volatile.

Though we continue to see increased interest and adoption of electric vehicles, if the market for electric vehicles in general and Tesla vehicles in particular does not develop as we expect, develops more slowly than we expect, or if demand for our vehicles decreases in our markets or our vehicles compete with each other, our business, prospects, financial condition and operating results may be harmed.

In addition, electric vehicles still constitute a small percentage of overall vehicle sales. As a result, the market for our vehicles could be negatively affected by numerous factors, such as:

- perceptions about electric vehicle features, quality, safety, performance and cost;
- perceptions about the limited range over which electric vehicles may be driven on a single battery charge, and access to charging facilities;
- competition, including from other types of alternative fuel vehicles, plug-in hybrid electric vehicles and high fuel-economy internal combustion engine vehicles;
- volatility in the cost of oil, gasoline and energy, such as wide fluctuations in crude oil prices during 2020;
- government regulations and economic incentives and conditions; and
- concerns about our future viability.

Finally, the target demographics for our vehicles, particularly Model 3 and Model Y, are highly competitive. Sales of vehicles in the automotive industry tend to be cyclical in many markets, which may expose us to further volatility.

We face strong competition for our products and services from a growing list of established and new competitors.

The worldwide automotive market is highly competitive today and we expect it will become even more so in the future. For example, Model 3 and Model Y face competition from existing and future automobile manufacturers in the extremely competitive entry-level premium sedan and compact SUV markets. A significant and growing number of established and new automobile manufacturers, as well as other companies, have entered, or are reported to have plans to enter, the market for electric and other alternative fuel vehicles, including hybrid, plug-in hybrid and fully electric vehicles, as well as the market for self-driving technology and other vehicle applications and software platforms. In some cases, our competitors offer or will offer electric vehicles in important markets such as China and Europe, and/or have announced an intention to produce electric vehicles exclusively at some point in the future. Many of our competitors have significantly more or better-established resources than we do to devote to the design, development, manufacturing, distribution, promotion, sale and support of their products. Increased competition could result in our lower vehicle unit sales, price reductions, revenue shortfalls, loss of customers and loss of market share, which may harm our business, financial condition and operating results.

We also face competition in our energy generation and storage business from other manufacturers, developers, installers and service providers of competing energy technologies, as well as from large utilities. Decreases in the retail or wholesale prices of electricity from utilities or other renewable energy sources could make our products less attractive to customers and lead to an increased rate of customer defaults.

Risks Related to Our Operations

We may experience issues with lithium-ion cells or other components manufactured at our Gigafactories, which may harm the production and profitability of our vehicle and energy storage products.

Our plan to grow the volume and profitability of our vehicles and energy storage products depends on significant lithium-ion battery cell production, including by our partner Panasonic at Gigafactory Nevada. We also produce several vehicle components at our Gigafactories, such as battery modules and packs and drive units, and manufacture energy storage products. In the past, some of the manufacturing lines for certain product components took longer than anticipated to ramp to their full capacity, and additional bottlenecks may arise in the future as we continue to increase the production rate and introduce new lines. In addition, as the IRA provides new incentives for domestic energy production and manufacturing, we may face increasing competition from other automobile manufacturers as well as suppliers for the resources and capacity to build additional factories and expand our operations domestically. If we are unable to or otherwise do not maintain and grow our respective operations, or if we are unable to do so cost-effectively or hire and retain highly-skilled personnel there, our ability to manufacture our products profitably would be limited, which may harm our business and operating results.

Finally, the high volumes of lithium-ion cells and battery modules and packs manufactured by us and by our suppliers are stored and recycled at our various facilities. Any mishandling of these products may cause disruption to the operation of such facilities. While we have implemented safety procedures related to the handling of the cells, there can be no assurance that a safety issue or fire related to the cells would not disrupt our operations. Any such disruptions or issues may harm our brand and business.

We face risks associated with maintaining and expanding our international operations, including unfavorable and uncertain regulatory, political, economic, tax and labor conditions.

We are subject to legal and regulatory requirements, political uncertainty and social, environmental and economic conditions in numerous jurisdictions, including markets in which we generate significant sales, over which we have little control and which are inherently unpredictable. Our operations in such jurisdictions, particularly as a company based in the U.S., create risks relating to conforming our products to regulatory and safety requirements and charging and other electric infrastructures; organizing local operating entities; establishing, staffing and managing foreign business locations; attracting local customers; navigating foreign government taxes, regulations and permit requirements; enforceability of our contractual rights; trade restrictions, customs regulations, tariffs and price or exchange controls; and preferences in foreign nations for domestically manufactured products. Such conditions may increase our costs, impact our ability to sell our products and require significant management attention, and may harm our business if we are unable to manage them effectively.

Our business may suffer if our products or features contain defects, fail to perform as expected or take longer than expected to become fully functional.

If our products contain design or manufacturing defects that cause them not to perform as expected or that require repair, or certain features of our vehicles such as new Autopilot or FSD features take longer than expected to become enabled, are legally restricted or become subject to onerous regulation, our ability to develop, market and sell our products and services may be harmed, and we may experience delivery delays, product recalls, product liability, breach of warranty and consumer protection claims and significant warranty and other expenses. There is no guarantee that any incremental changes in the specific equipment we deploy in our vehicles over time will not result in initial functional disparities from prior iterations or will perform as expected in the timeframe we anticipate, or at all.

Our products are also highly dependent on software, which is inherently complex and may contain latent defects or errors or be subject to external attacks. Issues experienced by our customers have included those related to taillights, seat belt chimes and display screens in certain Tesla models. Although we attempt to remedy any issues we observe in our products as effectively and rapidly as possible, such efforts may not be timely, may hamper production or may not completely satisfy our customers. While we have performed, and continue to perform, extensive internal testing on our products and features, we currently have a limited frame of reference by which to evaluate their long-term quality, reliability, durability and performance characteristics. There can be no assurance that we will be able to detect and fix any defects in our products prior to their sale to or installation for customers.

We may be required to defend or insure against product liability claims.

The automobile industry generally experiences significant product liability claims, and as such we face the risk of such claims in the event our vehicles do not perform or are claimed to not have performed as expected. As is true for other automakers, our vehicles have been involved and we expect in the future will be involved in accidents resulting in death or personal injury, and such accidents where Autopilot, Enhanced Autopilot or FSD Capability features are engaged are the subject of significant public attention, especially in light of NHTSA's Standing General Order requiring reports regarding crashes involving vehicles with advanced driver assistance systems. We have experienced, and we expect to continue to face, claims and regulatory scrutiny arising from or related to misuse or claimed failures or alleged misrepresentations of such new technologies that we are pioneering. In addition, the battery packs that we produce make use of lithium-ion cells. On rare occasions, lithium-ion cells can rapidly release the energy they contain by venting

smoke and flames in a manner that can ignite nearby materials as well as other lithium-ion cells. While we have designed our battery packs to passively contain any single cell's release of energy without spreading to neighboring cells, there can be no assurance that a field or testing failure of our vehicles or other battery packs that we produce will not occur, in particular due to a high-speed crash. Likewise, as our solar energy systems and energy storage products generate and store electricity, they have the potential to fail or cause injury to people or property. Any product liability claim may subject us to lawsuits and substantial monetary damages, product recalls or redesign efforts, and even a meritless claim may require us to defend it, all of which may generate negative publicity and be expensive and time-consuming. In most jurisdictions, we generally self-insure against the risk of product liability claims for vehicle exposure, meaning that any product liability claims will likely have to be paid from company funds and not by insurance.

We will need to maintain public credibility and confidence in our long-term business prospects in order to succeed.

In order to maintain and grow our business, we must maintain credibility and confidence among customers, suppliers, analysts, investors, ratings agencies and other parties in our long-term financial viability and business prospects. Maintaining such confidence may be challenging due to our limited operating history relative to established competitors; customer unfamiliarity with our products; any delays we may experience in scaling manufacturing, delivery and service operations to meet demand; competition and uncertainty regarding the future of electric vehicles or our other products and services; our quarterly production and sales performance compared with market expectations; and other factors including those over which we have no control. In particular, Tesla's products, business, results of operations, and statements and actions of Tesla and its management are well-publicized by a range of third parties. Such attention can include criticism, which may be exaggerated or unfounded, such as speculation regarding the sufficiency or stability of our management team. Any such negative perceptions, whether caused by us or not, may harm our business and make it more difficult to raise additional funds if needed.

We may be unable to effectively grow, or manage the compliance, residual value, financing and credit risks related to, our various financing programs.

We offer financing arrangements for our vehicles in North America, Europe and Asia primarily ourselves and through various financial institutions. We also currently offer vehicle financing arrangements directly through our local subsidiaries in certain markets. Depending on the country, such arrangements are available for specified models and may include operating leases directly with us under which we typically receive only a very small portion of the total vehicle purchase price at the time of lease, followed by a stream of payments over the term of the lease. We have also offered various arrangements for customers of our solar energy systems whereby they pay us a fixed payment to lease or finance the purchase of such systems or purchase electricity generated by them. If we do not successfully monitor and comply with applicable national, state and/or local financial regulations and consumer protection laws governing these transactions, we may become subject to enforcement actions or penalties.

The profitability of any directly-leased vehicles returned to us at the end of their leases depends on our ability to accurately project our vehicles' residual values at the outset of the leases, and such values may fluctuate prior to the end of their terms depending on various factors such as supply and demand of our used vehicles, economic cycles and the pricing of new vehicles. We have made in the past and may make in the future certain adjustments to our prices from time to time in the ordinary course of business, which may impact the residual values of our vehicles and reduce the profitability of our vehicle leasing program. The funding and growth of this program also rely on our ability to secure adequate financing and/or business partners. If we are unable to adequately fund our leasing program through internal funds, partners or other financing sources, and compelling alternative financing programs are not available for our customers who may expect or need such options, we may be unable to grow our vehicle deliveries. Furthermore, if our vehicle leasing business grows substantially, our business may suffer if we cannot effectively manage the resulting greater levels of residual risk.

Similarly, we have provided resale value guarantees to vehicle customers and partners for certain financing programs, under which such counterparties may sell their vehicles back to us at certain points in time at pre-determined amounts. However, actual resale values are subject to fluctuations over the term of the financing arrangements, such as from the vehicle pricing changes discussed above. If the actual resale values of any vehicles resold or returned to us pursuant to these programs are materially lower than the pre-determined amounts we have offered, our financial condition and operating results may be harmed.

Finally, our vehicle and solar energy system financing programs and our energy storage sales programs also expose us to customer credit risk. In the event of a widespread economic downturn or other catastrophic event, our customers may be unable or unwilling to satisfy their payment obligations to us on a timely basis or at all. If a significant number of our customers default, we may incur substantial credit losses and/or impairment charges with respect to the underlying assets.

We must manage ongoing obligations under our agreement with the Research Foundation for the State University of New York relating to our Gigafactory New York.

We are party to an operating lease and a research and development agreement through the State University of New York (the "SUNY Foundation"). These agreements provide for the construction and use of our Gigafactory New York, which we have primarily used for the development and production of our Solar Roof and other solar products and components, energy storage components and Supercharger components, and for other lessor-approved functions. Under this agreement, we are obligated to, among other things, meet employment targets as well as specified minimum numbers of personnel in the State of New York and in Buffalo, New York and spend or incur $5.00 billion in combined capital, operational expenses, costs of goods sold and other costs in the State of New York during a period that was initially 10 years beginning April 30, 2018. As of December 31, 2022, we are currently in excess of such targets relating to investments and personnel in the State of New York and Buffalo. While we expect to have and grow significant operations at Gigafactory New York and the surrounding Buffalo area, any failure by us in any year over the course of the term of the agreement to meet all applicable future obligations may result in our obligation to pay a "program payment" of $41 million to the SUNY Foundation for such year, the termination of our lease at Gigafactory New York which may require us to pay additional penalties, and/or the need to adjust certain of our operations, in particular our production ramp of the Solar Roof or other components. Any of the foregoing events may harm our business, financial condition and operating results.

If we are unable to attract, hire and retain key employees and qualified personnel, our ability to compete may be harmed.

The loss of the services of any of our key employees or any significant portion of our workforce could disrupt our operations or delay the development, introduction and ramp of our products and services. In particular, we are highly dependent on the services of Elon Musk, Technoking of Tesla and our Chief Executive Officer. None of our key employees is bound by an employment agreement for any specific term and we may not be able to successfully attract and retain senior leadership necessary to grow our business. Our future success also depends upon our ability to attract, hire and retain a large number of engineering, manufacturing, marketing, sales and delivery, service, installation, technology and support personnel, especially to support our planned high-volume product sales, market and geographical expansion and technological innovations. If we are not successful in managing these risks, our business, financial condition and operating results may be harmed.

Employees may leave Tesla or choose other employers over Tesla due to various factors, such as a very competitive labor market for talented individuals with automotive or technology experience, or any negative publicity related to us. In regions where we have or will have operations, particularly significant engineering and manufacturing centers, there is strong competition for individuals with skillsets needed for our business, including specialized knowledge of electric vehicles, engineering and electrical and building construction expertise. Moreover, we may be impacted by perceptions relating to reductions in force that we have conducted in the past in order to optimize our organizational structure and reduce costs and the departure of certain senior personnel for various reasons. We also compete with both mature and prosperous companies that have far greater financial resources than we do and start-ups and emerging companies that promise short-term growth opportunities.

Finally, our compensation philosophy for all of our personnel reflects our startup origins, with an emphasis on equity-based awards and benefits in order to closely align their incentives with the long-term interests of our stockholders. We periodically seek and obtain approval from our stockholders for future increases to the number of awards available under our equity incentive and employee stock purchase plans. If we are unable to obtain the requisite stockholder approvals for such future increases, we may have to expend additional cash to compensate our employees and our ability to retain and hire qualified personnel may be harmed.

We are highly dependent on the services of Elon Musk, Technoking of Tesla and our Chief Executive Officer.

We are highly dependent on the services of Elon Musk, Technoking of Tesla and our Chief Executive Officer. Although Mr. Musk spends significant time with Tesla and is highly active in our management, he does not devote his full time and attention to Tesla. Mr. Musk also currently serves as Chief Executive Officer and Chief Technical Officer of Space Exploration Technologies Corp., a developer and manufacturer of space launch vehicles, Chief Executive Officer of Twitter, Inc., a social media company, and is involved in other emerging technology ventures.

Our information technology systems or data, or those of our service providers or customers or users could be subject to cyber-attacks or other security incidents, which could result in data breaches, intellectual property theft, claims, litigation, regulatory investigations, significant liability, reputational damage and other adverse consequences.

We continue to expand our information technology systems as our operations grow, such as product data management, procurement, inventory management, production planning and execution, sales, service and logistics, dealer management, financial, tax and regulatory compliance systems. This includes the implementation of new internally developed systems and the deployment of such systems in the U.S. and abroad. While, we maintain information technology measures designed to protect us against intellectual property theft, data breaches, sabotage and other external or internal cyber-attacks or misappropriation, our systems and those of our service providers are potentially vulnerable to malware, ransomware, viruses, denial-of-service attacks, phishing attacks, social engineering, computer hacking, unauthorized access, exploitation of bugs, defects and vulnerabilities, breakdowns, damage, interruptions, system malfunctions, power outages, terrorism, acts of vandalism, security breaches, security incidents, inadvertent or intentional actions by employees or other third parties, and other cyber-attacks.

To the extent any security incident results in unauthorized access or damage to or acquisition, use, corruption, loss, destruction, alteration or dissemination of our data, including intellectual property and personal information, or our products or vehicles, or for it to be believed or reported that any of these occurred, it could disrupt our business, harm our reputation, compel us to comply with applicable data breach notification laws, subject us to time consuming, distracting and expensive litigation, regulatory investigation and oversight, mandatory corrective action, require us to verify the correctness of database contents, or otherwise subject us to liability under laws, regulations and contractual obligations, including those that protect the privacy and security of personal information. This could result in increased costs to us and result in significant legal and financial exposure and/or reputational harm.

We also rely on service providers, and similar incidents relating to their information technology systems could also have a material adverse effect on our business. There have been and may continue to be significant supply chain attacks. Our service providers, including our workforce management software provider, have been subject to ransomware and other security incidents, and we cannot guarantee that our or our service providers' systems have not been breached or that they do not contain exploitable defects, bugs, or vulnerabilities that could result in a security incident, or other disruption to, our or our service providers' systems. Our ability to monitor our service providers' security measures is limited, and, in any event, malicious third parties may be able to circumvent those security measures.

Further, the implementation, maintenance, segregation and improvement of these systems require significant management time, support and cost, and there are inherent risks associated with developing, improving and expanding our core systems as well as implementing new systems and updating current systems, including disruptions to the related areas of business operation. These risks may affect our ability to manage our data and inventory, procure parts or supplies or manufacture, sell, deliver and service products, adequately protect our intellectual property or achieve and maintain compliance with, or realize available benefits under, tax laws and other applicable regulations.

Moreover, if we do not successfully implement, maintain or expand these systems as planned, our operations may be disrupted, our ability to accurately and/or timely report our financial results could be impaired and deficiencies may arise in our internal control over financial reporting, which may impact our ability to certify our financial results. Moreover, our proprietary information, including intellectual property and personal information, could be compromised or misappropriated and our reputation may be adversely affected. If these systems or their functionality do not operate as we expect them to, we may be required to expend significant resources to make corrections or find alternative sources for performing these functions.

Any unauthorized control or manipulation of our products' systems could result in loss of confidence in us and our products.

Our products contain complex information technology systems. For example, our vehicles and energy storage products are designed with built-in data connectivity to accept and install periodic remote updates from us to improve or update their functionality. While we have implemented security measures intended to prevent unauthorized access to our information technology networks, our products and their systems, malicious entities have reportedly attempted, and may attempt in the future, to gain unauthorized access to modify, alter and use such networks, products and systems to gain control of, or to change, our products' functionality, user interface and performance characteristics or to gain access to data stored in or generated by our products. We encourage reporting of potential vulnerabilities in the security of our products through our security vulnerability reporting policy, and we aim to remedy any reported and verified vulnerability. However, there can be no assurance that any vulnerabilities will not be exploited before they can be identified, or that our remediation efforts are or will be successful.

Any unauthorized access to or control of our products or their systems or any loss of data could result in legal claims or government investigations. In addition, regardless of their veracity, reports of unauthorized access to our products, their systems or data, as well as other factors that may result in the perception that our products, their systems or data are capable of being hacked, may harm our brand, prospects and operating results. We have been the subject of such reports in the past.

Our business may be adversely affected by any disruptions caused by union activities.

It is not uncommon for employees of certain trades at companies such as ours to belong to a union, which can result in higher employee costs and increased risk of work stoppages. Moreover, regulations in some jurisdictions outside of the U.S. mandate employee participation in industrial collective bargaining agreements and work councils with certain consultation rights with respect to the relevant companies' operations. Although we work diligently to provide the best possible work environment for our employees, they may still decide to join or seek recognition to form a labor union, or we may be required to become a union signatory. From time to time, labor unions have engaged in campaigns to organize certain of our operations, as part of which such unions have filed unfair labor practice charges against us with the National Labor Relations Board (the "NLRB"), and they may do so in the future. In September 2019, an administrative law judge issued a recommended decision for Tesla on certain issues and against us on certain others. In March 2021, the NLRB adopted a portion of the recommendation and overturned others. Tesla appealed the decision to the United States Circuit Court for the Fifth Circuit, which is currently pending. Any unfavorable ultimate outcome for Tesla may have a negative impact on the perception of Tesla's treatment of our employees. Furthermore, we are directly or indirectly dependent upon companies with unionized work forces, such as suppliers and trucking and freight companies. Any work stoppages or strikes organized by such unions could delay the manufacture and sale of our products and may harm our business and operating results.

We may choose to or be compelled to undertake product recalls or take other similar actions.

As a manufacturing company, we must manage the risk of product recalls with respect to our products. Recalls for our vehicles have resulted from various hardware and software-related safety defect or non-compliance determinations. In addition to recalls initiated by us for various causes, testing of or investigations into our products by government regulators or industry groups may compel us to initiate product recalls or may result in negative public perceptions about the safety of our products, even if we disagree with the defect determination or have data that contradicts it. In the future, we may voluntarily or involuntarily initiate recalls if any of our products are determined by us or a regulator to contain a safety defect or be noncompliant with applicable laws and regulations, such as U.S. Federal Motor Vehicle Safety Standards. Such recalls, whether voluntary or involuntary or caused by systems or components engineered or manufactured by us or our suppliers, could result in significant expense, supply chain complications and service burdens, and may harm our brand, business, prospects, financial condition and operating results.

Our current and future warranty reserves may be insufficient to cover future warranty claims.

We provide a manufacturer's warranty on all new and used Tesla vehicles we sell. We also provide certain warranties with respect to the energy generation and storage systems we sell, including on their installation and maintenance. For components not manufactured by us, we generally pass through to our customers the applicable manufacturers' warranties, but may retain some warranty responsibilities for some or all of the life of such components. As part of our energy generation and storage system contracts, we may provide the customer with performance guarantees that guarantee that the underlying system will meet or exceed the minimum energy generation or other energy performance requirements specified in the contract. Under these performance guarantees, we generally bear the risk of electricity production or other performance shortfalls, including in some cases shortfalls caused by failures in components from third party manufacturers. These risks are exacerbated in the event such manufacturers cease operations or fail to honor their warranties.

If our warranty reserves are inadequate to cover future warranty claims on our products, our financial condition and operating results may be harmed. Warranty reserves include our management's best estimates of the projected costs to repair or to replace items under warranty, which are based on actual claims incurred to date and an estimate of the nature, frequency and costs of future claims. Such estimates are inherently uncertain and changes to our historical or projected experience, especially with respect to products that we have introduced relatively recently and/or that we expect to produce at significantly greater volumes than our past products, may cause material changes to our warranty reserves in the future.

Our insurance coverage strategy may not be adequate to protect us from all business risks.

We may be subject, in the ordinary course of business, to losses resulting from products liability, accidents, acts of God and other claims against us, for which we may have no insurance coverage. As a general matter, we do not maintain as much insurance coverage as many other companies do, and in some cases, we do not maintain any at all. Additionally, the policies that we do have may include significant deductibles or self-insured retentions, policy limitations and exclusions, and we cannot be certain that our insurance coverage will be sufficient to cover all future losses or claims against us. A loss that is uninsured or which exceeds policy limits may require us to pay substantial amounts, which may harm our financial condition and operating results.

Our debt agreements contain covenant restrictions that may limit our ability to operate our business.

The terms of certain of our debt facilities contain, and any of our other future debt agreements may contain, covenant restrictions that may limit our ability to operate our business, including restrictions on our and/or our subsidiaries' ability to, among other things, incur additional debt or create liens. In addition, under certain circumstances we are required to comply with a fixed charge coverage ratio. As a result of these covenants, our ability to respond to changes in business and economic conditions and engage in beneficial transactions, including to obtain additional financing as needed, may be restricted. Furthermore, our failure to comply with our debt covenants could result in a default under our debt agreements, which could permit the holders to accelerate our obligation to repay the debt. If any of our debt is accelerated, we may not have sufficient funds available to repay it.

Additional funds may not be available to us when we need or want them.

Our business and our future plans for expansion are capital-intensive, and the specific timing of cash inflows and outflows may fluctuate substantially from period to period. We may need or want to raise additional funds through the issuance of equity, equity-related or debt securities or through obtaining credit from financial institutions to fund, together with our principal sources of liquidity, the costs of developing and manufacturing our current or future products, to pay any significant unplanned or accelerated expenses or for new significant strategic investments, or to refinance our significant consolidated indebtedness, even if not required to do so by the terms of such indebtedness. We cannot be certain that additional funds will be available to us on favorable terms when required, or at all. If we cannot raise additional funds when we need them, our financial condition, results of operations, business and prospects could be materially and adversely affected.

We may be negatively impacted by any early obsolescence of our manufacturing equipment.

We depreciate the cost of our manufacturing equipment over their expected useful lives. However, product cycles or manufacturing technology may change periodically, and we may decide to update our products or manufacturing processes more quickly than expected. Moreover, improvements in engineering and manufacturing expertise and efficiency may result in our ability to manufacture our products using less of our currently installed equipment. Alternatively, as we ramp and mature the production of our products to higher levels, we may discontinue the use of already installed equipment in favor of different or additional equipment. The useful life of any equipment that would be retired early as a result would be shortened, causing the depreciation on such equipment to be accelerated, and our results of operations may be harmed.

There is no guarantee that we will have sufficient cash flow from our business to pay our indebtedness or that we will not incur additional indebtedness.

As of December 31, 2022, we and our subsidiaries had outstanding $2.06 billion in aggregate principal amount of indebtedness (see Note 11, *Debt*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K). Our consolidated indebtedness may increase our vulnerability to any generally adverse economic and industry conditions. We and our subsidiaries may, subject to the limitations in the terms of our existing and future indebtedness, incur additional debt, secure existing or future debt or recapitalize our debt.

Our ability to make scheduled payments of the principal and interest on our indebtedness when due, to make payments upon conversion or repurchase demands with respect to our convertible senior notes or to refinance our indebtedness as we may need or desire, depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not continue to generate cash flow from operations in the future sufficient to satisfy our obligations under our existing indebtedness and any future indebtedness we may incur, and to make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as reducing or delaying investments or capital expenditures, selling assets, refinancing or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance existing or future indebtedness will depend on the capital markets and our financial condition at such time. In addition, our ability to make payments may be limited by law, by regulatory authority or by agreements governing our future indebtedness. We may not be able to engage in these activities on desirable terms or at all, which may result in a default on our existing or future indebtedness and harm our financial condition and operating results.

We are exposed to fluctuations in currency exchange rates.

We transact business globally in multiple currencies and have foreign currency risks related to our revenue, costs of revenue, operating expenses and localized subsidiary debt denominated in currencies other than the U.S. dollar, currently primarily the Chinese yuan, euro, pound sterling and Norwegian krone. To the extent we have significant revenues denominated in such foreign currencies, any strengthening of the U.S. dollar would tend to reduce our revenues as measured in U.S. dollars, as we have historically experienced, and are currently experiencing. In addition, a portion of our costs and expenses have been, and we anticipate will continue to be, denominated in foreign currencies, including the Chinese yuan and Japanese yen. If we do not have fully offsetting revenues in these currencies and if the value of the U.S. dollar depreciates significantly against these currencies, our costs as measured in U.S. dollars as a percent of our revenues will correspondingly increase and our margins will suffer. Moreover, while we undertake limited hedging activities intended to offset the impact of currency translation exposure, it is impossible to predict or eliminate such impact. As a result, our operating results may be harmed.

We may need to defend ourselves against intellectual property infringement claims, which may be time-consuming and expensive.

Our competitors or other third parties may hold or obtain patents, copyrights, trademarks or other proprietary rights that could prevent, limit or interfere with our ability to make, use, develop, sell or market our products and services, which could make it more difficult for us to operate our business. From time to time, the holders of such intellectual property rights may assert their rights and urge us to take licenses and/or may bring suits alleging infringement or misappropriation of such rights, which could result in substantial costs, negative publicity and management attention, regardless of merit. While we endeavor to obtain and protect the intellectual property rights that we expect will allow us to retain or advance our strategic initiatives, there can be no assurance that we will be able to adequately identify and protect the portions of intellectual property that are strategic to our business, or mitigate the risk of potential suits or other legal demands by our competitors. Accordingly, we may consider the entering into licensing agreements with respect to such rights, although no assurance can be given that such licenses can be obtained on acceptable terms or that litigation will not occur, and such licenses and associated litigation could significantly increase our operating expenses. In addition, if we are determined to have or believe there is a high likelihood that we have infringed upon a third party's intellectual property rights, we may be required to cease making, selling or incorporating certain components or intellectual property into the goods and services we offer, to pay substantial damages and/or license royalties, to redesign our products and services and/or to establish and maintain alternative branding for our products and services. In the event that we are required to take one or more such actions, our brand, business, financial condition and operating results may be harmed.

Increased scrutiny and changing expectations from stakeholders with respect to the Company's ESG practices may result in additional costs or risks.

Companies across many industries are facing increasing scrutiny related to their environmental, social and governance (ESG) practices. Investor advocacy groups, certain institutional investors, investment funds and other influential investors are also increasingly focused on ESG practices and in recent years have placed increasing importance on the non-financial impacts of their investments. While our mission is to accelerate the world's transition to sustainable energy, if our ESG practices do not meet investor or other industry stakeholder expectations, which continue to evolve, we may incur additional costs and our brand, ability to attract and retain qualified employees and business may be harmed.

Our operations could be adversely affected by events outside of our control, such as natural disasters, wars or health epidemics.

We may be impacted by natural disasters, wars, health epidemics, weather conditions, the long-term effects of climate change, power outages or other events outside of our control. For example, our Fremont Factory and Gigafactory Nevada are located in seismically active regions in Northern California and Nevada, and our Gigafactory Shanghai is located in a flood-prone area. Moreover, the area in which our Gigafactory Texas is located experienced severe winter storms in the first quarter of 2021 that had a widespread impact on utilities and transportation. If major disasters such as earthquakes, floods or other climate-related events occur, or our information system or communication breaks down or operates improperly, our headquarters and production facilities may be seriously damaged, or we may have to stop or delay production and shipment of our products. In addition, the global COVID-19 pandemic has impacted economic markets, manufacturing operations, supply chains, employment and consumer behavior in nearly every geographic region and industry across the world, and we have been, and may in the future be, adversely affected as a result. Also, the broader consequences in the current conflict between Russia and Ukraine, which may include further embargoes, regional instability and geopolitical shifts; airspace bans relating to certain routes, or strategic decisions to alter certain routes; and potential retaliatory action by the Russian government against companies, and the extent of the conflict on our business and operating results cannot be predicted. We may incur expenses or delays relating to such events outside of our control, which could have a material adverse impact on our business, operating results and financial condition.

Risks Related to Government Laws and Regulations

Demand for our products and services may be impacted by the status of government and economic incentives supporting the development and adoption of such products.

Government and economic incentives that support the development and adoption of electric vehicles in the U.S. and abroad, including certain tax exemptions, tax credits and rebates, may be reduced, eliminated or exhausted from time to time. For example, previously available incentives favoring electric vehicles in areas including Ontario, Canada, Netherlands, Italy, Hong Kong and California have expired or were cancelled or temporarily unavailable, and in some cases were not eventually replaced or reinstituted, which may have negatively impacted sales. Certain government and economic incentives, similar to the IRA, may also be implemented that provide benefits to manufacturers who assemble domestically, have local suppliers or have other characteristics that may not apply to Tesla. Such developments could negatively impact demand for our vehicles, and we and our customers may have to adjust to them, including through pricing modifications.

In addition, certain governmental rebates, tax credits and other financial incentives that are currently available with respect to our solar and energy storage product businesses allow us to lower our costs and encourage customers to buy our products and investors to invest in our solar financing funds. However, these incentives may expire when the allocated funding is exhausted, reduced or terminated as renewable energy adoption rates increase, sometimes without warning. Likewise, in jurisdictions where net metering is currently available, our customers receive bill credits from utilities for energy that their solar energy systems generate and export to the grid in excess of the electric load they use. The benefit available under net metering has been or has been proposed to be reduced, altered or eliminated in several jurisdictions, and has also been contested and may continue to be contested before the Federal Energy Regulatory Commission. Any reductions or terminations of such incentives may harm our business, prospects, financial condition and operating results by making our products less competitive for customers, increasing our cost of capital and adversely impacting our ability to attract investment partners and to form new financing funds for our solar and energy storage assets.

Finally, we and our fund investors claim these U.S. federal tax credits and certain state incentives in amounts based on independently appraised fair market values of our solar and energy storage systems. Some governmental authorities have audited such values and in certain cases have determined that these values should be lower, and they may do so again in the future. Such determinations may result in adverse tax consequences and/or our obligation to make indemnification or other payments to our funds or fund investors.

We are subject to evolving laws and regulations that could impose substantial costs, legal prohibitions or unfavorable changes upon our operations or products.

As we grow our manufacturing operations in additional regions, we are or will be subject to complex environmental, manufacturing, health and safety laws and regulations at numerous jurisdictional levels in the U.S., China, Germany and other locations abroad, including laws relating to the use, handling, storage, recycling, disposal and/or human exposure to hazardous materials, product material inputs and post-consumer products and with respect to constructing, expanding and maintaining our facilities. New, or changes in, environmental and climate change laws, regulations or rules could also lead to increased costs of compliance, including remediations of any discovered issues, and changes to our operations, which may be significant, and any failures to comply could result in significant expenses, delays or fines. In addition, as we have increased our employee headcount and operations, we are and may continue to be subject to increased scrutiny, including litigation and government investigations relating to allegations such as discrimination and workplace misconduct, that we will need to defend against. If we are unable to successfully defend ourselves in such litigation or government investigations, it may harm our brand, ability to attract and retain qualified employees, business and financial condition. We are also subject to laws and regulations applicable to the supply, manufacture, import, sale, service and performance of our products both domestically and abroad. For example, in countries outside of the U.S., we are required to meet standards relating to vehicle safety, fuel economy and emissions that are often materially different from equivalent requirements in the U.S., thus resulting in additional investment into the vehicles and systems to ensure regulatory compliance in all countries. This process may include official review and certification of our vehicles by foreign regulatory agencies prior to market entry, as well as compliance with foreign reporting and recall management systems requirements.

In particular, we offer in our vehicles in certain markets Autopilot and FSD Capability features that today assist drivers with certain tedious and potentially dangerous aspects of road travel, but which currently require drivers to remain fully engaged in the driving operation. We are continuing to develop our Autopilot and FSD Capability technology. There are a variety of international, federal and state regulations that may apply to, and may adversely affect, the design and performance, sale, registration and operation of Autopilot and FSD Capability, and future capability, including full self-driving vehicles that may not be operated by a human driver. This includes many existing vehicle standards that were not originally intended to apply to vehicles that may not be operated by a human driver. Such regulations continue to rapidly change, which increases the likelihood of a patchwork of complex or conflicting regulations, or may delay, restrict or prohibit the availability of certain functionalities and vehicle designs, which could adversely affect our business.

Finally, as a manufacturer, installer and service provider with respect to solar generation and energy storage systems, a supplier of electricity generated and stored by certain of the solar energy and energy storage systems we install for customers, and a provider of

grid services through virtual power plant models, we are impacted by federal, state and local regulations and policies concerning the import or export of components, electricity pricing, the interconnection of electricity generation and storage equipment with the electrical grid and the sale of electricity generated by third party-owned systems. If regulations and policies are introduced that adversely impact the import or export of components, or the interconnection, maintenance or use of our solar and energy storage systems, they could deter potential customers from purchasing our solar and energy storage products and services, threaten the economics of our existing contracts and cause us to cease solar and energy storage system sales and services in the relevant jurisdictions, which may harm our business, financial condition and operating results.

Any failure by us to comply with a variety of U.S. and international privacy and consumer protection laws may harm us.

Any failure by us or our vendor or other business partners to comply with our public privacy notice or with federal, state or international privacy, data protection or security laws or regulations relating to the processing, collection, use, retention, security and transfer of personally identifiable information could result in regulatory or litigation-related actions against us, legal liability, fines, damages, ongoing audit requirements and other significant costs. Substantial expenses and operational changes may be required in connection with maintaining compliance with such laws, and even an unsuccessful challenge by customers or regulatory authorities of our activities could result in adverse publicity and could require a costly response from and defense by us. In addition, certain emerging privacy laws are still subject to a high degree of uncertainty as to their interpretation, application and impact, and may require extensive system and operational changes, be difficult to implement, increase our operating costs, adversely impact the cost or attractiveness of the products or services we offer, or result in adverse publicity and harm our reputation. For example, the General Data Protection Regulation applies to the processing of personal information collected from individuals located in the European Union, and has created new compliance obligations and significantly increased fines for noncompliance. Similarly, the California Consumer Privacy Act imposes certain legal obligations on our use and processing of personal information related to California residents. Finally, new privacy and cybersecurity laws have come into effect in China. In addition to the risks related to general privacy regulation, we may also be subject to specific vehicle manufacturer obligations relating to cybersecurity, data privacy and data localization requirements which place additional risks to our international operations. Risks and penalties could include ongoing audit requirements, data protection authority investigations, legal proceedings by international governmental entities or others resulting in mandated disclosure of sensitive data or other commercially unfavorable terms. Notwithstanding our efforts to protect the security and integrity of our customers' personal information, we may be required to expend significant resources to comply with data breach requirements if, for example, third parties improperly obtain and use the personal information of our customers or we otherwise experience a data loss with respect to customers' personal information. A major breach of our network security and systems may result in fines, penalties and damages and harm our brand, prospects and operating results.

We could be subject to liability, penalties and other restrictive sanctions and adverse consequences arising out of certain governmental investigations and proceedings.

We are cooperating with certain government investigations as discussed in Note 15, *Commitments and Contingencies*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K. To our knowledge, no government agency in any such ongoing investigation has concluded that any wrongdoing occurred. However, we cannot predict the outcome or impact of any such ongoing matters, and there exists the possibility that we could be subject to liability, penalties and other restrictive sanctions and adverse consequences if the SEC, the U.S. Department of Justice or any other government agency were to pursue legal action in the future. Moreover, we expect to incur costs in responding to related requests for information and subpoenas, and if instituted, in defending against any governmental proceedings.

For example, on October 16, 2018, the U.S. District Court for the Southern District of New York entered a final judgment approving the terms of a settlement filed with the Court on September 29, 2018, in connection with the actions taken by the SEC relating to Mr. Musk's statement on August 7, 2018 that he was considering taking Tesla private. Pursuant to the settlement, we, among other things, paid a civil penalty of $20 million, appointed an independent director as the chair of our board of directors, appointed two additional independent directors to our board of directors and made further enhancements to our disclosure controls and other corporate governance-related matters. On April 26, 2019, this settlement was amended to clarify certain of the previously-agreed disclosure procedures, which was subsequently approved by the Court. All other terms of the prior settlement were reaffirmed without modification. Although we intend to continue to comply with the terms and requirements of the settlement, if there is a lack of compliance or an alleged lack of compliance, additional enforcement actions or other legal proceedings may be instituted against us.

We may face regulatory challenges to or limitations on our ability to sell vehicles directly.

While we intend to continue to leverage our most effective sales strategies, including sales through our website, we may not be able to sell our vehicles through our own stores in certain states in the U.S. with laws that may be interpreted to impose limitations on this direct-to-consumer sales model. It has also been asserted that the laws in some states limit our ability to obtain dealer licenses from state motor vehicle regulators, and such assertions persist. In certain locations, decisions by regulators permitting us to sell vehicles have been, and may be, challenged by dealer associations and others as to whether such decisions comply with applicable state motor vehicle industry laws. We have prevailed in many of these lawsuits and such results have reinforced our continuing belief that state franchise laws were not intended to apply to a manufacturer that does not have franchise dealers anywhere in the world. In some states, there have also been regulatory and legislative efforts by dealer associations to propose laws that, if enacted, would prevent us from obtaining dealer licenses in their states given our current sales model. A few states have passed legislation that clarifies our ability to operate, but at the same time limits the number of dealer licenses we can obtain or stores that we can operate. The application of state laws applicable to our operations continues to be difficult to predict.

Internationally, there may be laws in jurisdictions we have not yet entered or laws we are unaware of in jurisdictions we have entered that may restrict our sales or other business practices. Even for those jurisdictions we have analyzed, the laws in this area can be complex, difficult to interpret and may change over time. Continued regulatory limitations and other obstacles interfering with our ability to sell vehicles directly to consumers may harm our financial condition and operating results.

Risks Related to the Ownership of Our Common Stock

The trading price of our common stock is likely to continue to be volatile.

The trading price of our common stock has been highly volatile and could continue to be subject to wide fluctuations in response to various factors, some of which are beyond our control. Our common stock has experienced over the last 52 weeks an intra-day trading high of $384.29 per share and a low of $101.81 per share, as adjusted to give effect to the three-for-one stock split in the form of a stock dividend in August 2022 (the "2022 Stock Split"). The stock market in general, and the market for technology companies in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. In particular, a large proportion of our common stock has been historically and may in the future be traded by short sellers which may put pressure on the supply and demand for our common stock, further influencing volatility in its market price. Public perception of our company or management and other factors outside of our control may additionally impact the stock price of companies like us that garner a disproportionate degree of public attention, regardless of actual operating performance. In addition, in the past, following periods of volatility in the overall market or the market price of our shares, securities class action litigation has been filed against us. While we defend such actions vigorously, any judgment against us or any future stockholder litigation could result in substantial costs and a diversion of our management's attention and resources.

Our financial results may vary significantly from period to period due to fluctuations in our operating costs and other factors.

We expect our period-to-period financial results to vary based on our operating costs, which we anticipate will fluctuate as the pace at which we continue to design, develop and manufacture new products and increase production capacity by expanding our current manufacturing facilities and adding future facilities, may not be consistent or linear between periods. Additionally, our revenues from period to period may fluctuate as we introduce existing products to new markets for the first time and as we develop and introduce new products. As a result of these factors, we believe that quarter-to-quarter comparisons of our financial results, especially in the short term, are not necessarily meaningful and that these comparisons cannot be relied upon as indicators of future performance. Moreover, our financial results may not meet expectations of equity research analysts, ratings agencies or investors, who may be focused only on short-term quarterly financial results. If any of this occurs, the trading price of our stock could fall substantially, either suddenly or over time.

We may fail to meet our publicly announced guidance or other expectations about our business, which could cause our stock price to decline.

We may provide from time to time guidance regarding our expected financial and business performance. Correctly identifying key factors affecting business conditions and predicting future events is inherently an uncertain process, and our guidance may not ultimately be accurate and has in the past been inaccurate in certain respects, such as the timing of new product manufacturing ramps. Our guidance is based on certain assumptions such as those relating to anticipated production and sales volumes (which generally are not linear throughout a given period), average sales prices, supplier and commodity costs and planned cost reductions. If our guidance varies from actual results, such as due to our assumptions not being met or the impact on our financial performance that could occur as a result of various risks and uncertainties, the market value of our common stock could decline significantly.

If Elon Musk were forced to sell shares of our common stock, either that he has pledged to secure certain personal loan obligations, or in satisfaction of other obligations, such sales could cause our stock price to decline.

Certain banking institutions have made extensions of credit to Elon Musk, our Chief Executive Officer, a portion of which was used to purchase shares of common stock in certain of our public offerings and private placements at the same prices offered to third-party participants in such offerings and placements. We are not a party to these loans, which are partially secured by pledges of a portion of the Tesla common stock currently owned by Mr. Musk. If the price of our common stock were to decline substantially, Mr. Musk may be forced by one or more of the banking institutions to sell shares of Tesla common stock to satisfy his loan obligations if he could not do so through other means. Any such sales could cause the price of our common stock to decline further. Further, Mr. Musk from time to time may commit to investing in significant business or other ventures, and as a result, be required to sell shares of our common stock in satisfaction of such commitments.

Anti-takeover provisions contained in our governing documents, applicable laws and our convertible senior notes could impair a takeover attempt.

Our certificate of incorporation and bylaws afford certain rights and powers to our board of directors that may facilitate the delay or prevention of an acquisition that it deems undesirable. We are also subject to Section 203 of the Delaware General Corporation Law and other provisions of Delaware law that limit the ability of stockholders in certain situations to effect certain business combinations. In addition, the terms of our convertible senior notes may require us to repurchase such notes in the event of a fundamental change, including a takeover of our company. Any of the foregoing provisions and terms that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We are headquartered in Austin, Texas. Our principal facilities include a large number of properties in North America, Europe and Asia utilized for manufacturing and assembly, warehousing, engineering, retail and service locations, Supercharger sites and administrative and sales offices. Our facilities are used to support both of our reporting segments, and are suitable and adequate for the conduct of our business. We primarily lease such facilities with the exception of some manufacturing facilities. The following table sets forth the location of our primary owned and leased manufacturing facilities.

Primary Manufacturing Facilities	Location	Owned or Leased
Gigafactory Texas	Austin, Texas	Owned
Fremont Factory	Fremont, California	Owned
Gigafactory Nevada	Sparks, Nevada	Owned
Gigafactory Berlin-Brandenburg	Grunheide, Germany	Owned
Gigafactory Shanghai	Shanghai, China	*
Gigafactory New York	Buffalo, New York	Leased
Megafactory	Lathrop, California	Leased

* We own the building and the land use rights with an initial term of 50 years. The land use rights are treated as operating lease right-of-use assets.

ITEM 3. LEGAL PROCEEDINGS

For a description of our material pending legal proceedings, please see Note 15, *Commitments and Contingencies*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

In addition, each of the matters below is being disclosed pursuant to Item 103 of Regulation S-K because it relates to environmental regulations and aggregate civil penalties that we currently believe could potentially exceed $1 million. We believe that any proceeding that is material to our business or financial condition is likely to have potential penalties far in excess of such amount.

The German Umweltbundesamt issued our subsidiary in Germany a notice and fine in the amount of 12 million euro alleging its non-compliance under applicable laws relating to market participation notifications and take-back obligations with respect to end-of-life battery products required thereunder. In response to Tesla's objection, the German Umweltbundesamt issued Tesla a revised fine notice dated April 29, 2021 in which it reduced the original fine amount to 1.45 million euro. This is primarily relating to administrative requirements, but Tesla has continued to take back battery packs, and filed a new objection in June 2021. A hearing took place on November 24, 2022, and the parties reached a settlement which resulted in a further reduction of the fine to 600,000 euro. Both parties have waived their right to appeal.

District attorneys in certain California counties are conducting an investigation into Tesla's waste segregation practices pursuant to Cal. Health & Saf. Code section 25100 et seq. and Cal. Civil Code § 1798.80. Tesla has implemented various remedial measures, including conducting training and audits, and enhancements to its site waste management programs. While the outcome of this matter cannot be determined at this time, it is not currently expected to have a material adverse impact on our business.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.