PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

Our common stock has traded on The NASDAQ Global Select Market under the symbol "TSLA" since it began trading on June 29, 2010. Our initial public offering was priced at approximately $1.13 per share on June 28, 2010 as adjusted to give effect to the 2022 Stock Split and the five-for-one stock split effected in the form of a stock dividend in August 2020 (the "2020 Stock Split").

Holders

As of January 25, 2023, there were 8,686 holders of record of our common stock. A substantially greater number of holders of our common stock are "street name" or beneficial holders, whose shares are held by banks, brokers and other financial institutions.

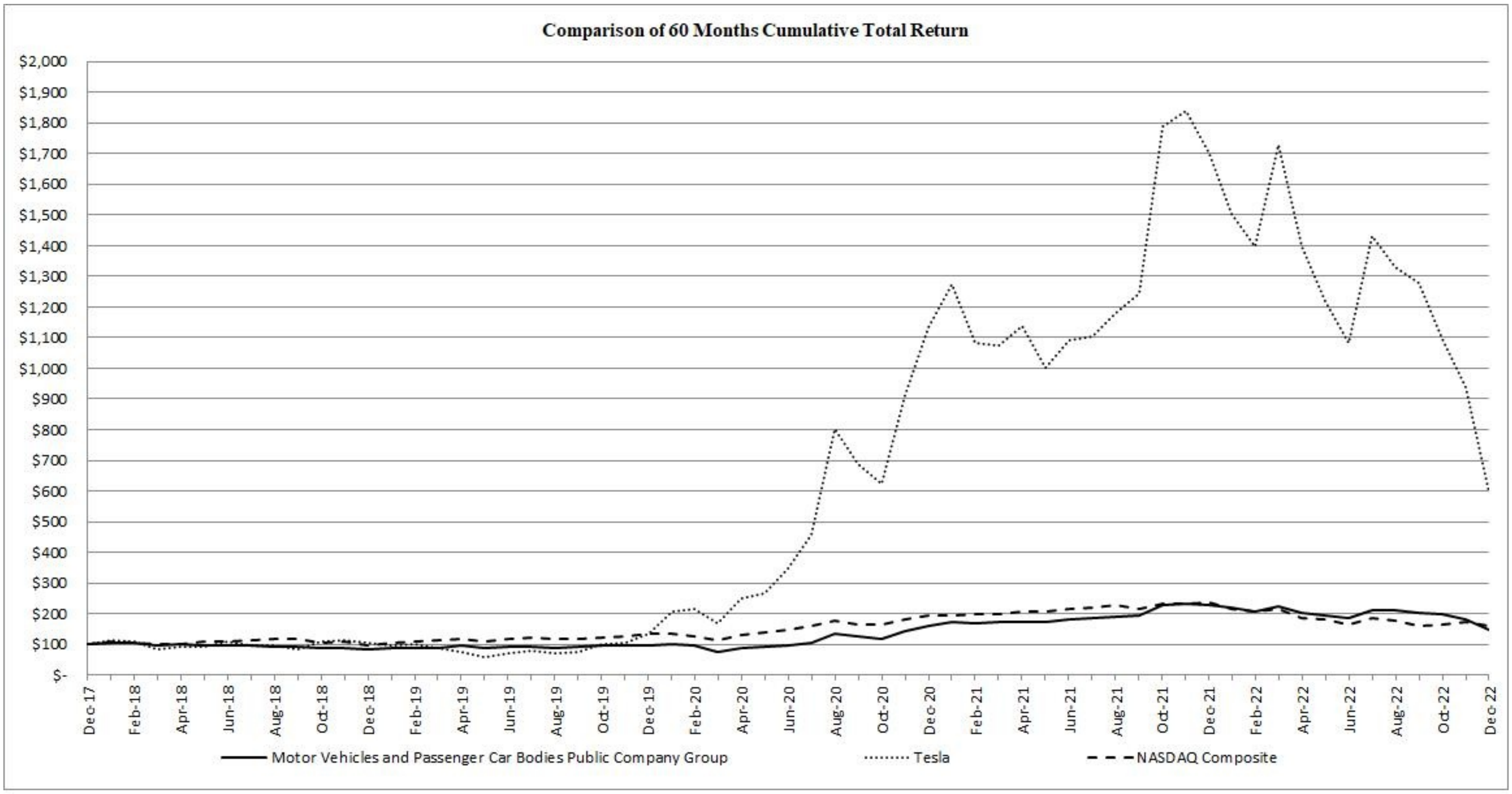
Dividend Policy

We have never declared or paid cash dividends on our common stock. We currently do not anticipate paying any cash dividends in the foreseeable future. Any future determination to declare cash dividends will be made at the discretion of our board of directors, subject to applicable laws, and will depend on our financial condition, results of operations, capital requirements, general business conditions and other factors that our board of directors may deem relevant.

Stock Performance Graph

This performance graph shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or incorporated by reference into any filing of Tesla, Inc. under the Securities Act of 1933, as amended (the "Securities Act"), or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

The following graph shows a comparison, from January 1, 2018 through December 31, 2022, of the cumulative total return on our common stock, The NASDAQ Composite Index and a group of all public companies sharing the same SIC code as us, which is SIC code 3711, "Motor Vehicles and Passenger Car Bodies" (Motor Vehicles and Passenger Car Bodies Public Company Group). Such returns are based on historical results and are not intended to suggest future performance. Data for The NASDAQ Composite Index and the Motor Vehicles and Passenger Car Bodies Public Company Group assumes an investment of $100 on January 1, 2018 and reinvestment of dividends. We have never declared or paid cash dividends on our common stock nor do we anticipate paying any such cash dividends in the foreseeable future.



Unregistered Sales of Equity Securities and Use of Proceeds

None

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

None.

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis should be read in conjunction with the consolidated financial statements and the related notes included elsewhere in this Annual Report on Form 10-K. For further discussion of our products and services, technology and competitive strengths, refer to Item 1- Business. For discussion related to changes in financial condition and the results of operations for fiscal year 2021-related items, refer to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our Annual Report on Form 10-K for fiscal year 2021, which was filed with the Securities and Exchange Commission on February 7, 2022.

Overview and 2022 Highlights

Our mission is to accelerate the world's transition to sustainable energy. We design, develop, manufacture, lease and sell high-performance fully electric vehicles, solar energy generation systems and energy storage products. We also offer maintenance, installation, operation, financial and other services related to our products. Additionally, we are increasingly focused on products and services based on artificial intelligence, robotics and automation.

In 2022, we produced 1,369,611 consumer vehicles and delivered 1,313,851 consumer vehicles, despite ongoing supply chain and logistics challenges and factory shutdowns. We are currently focused on increasing vehicle production, capacity and delivery capabilities, improving and developing battery technologies, improving our FSD capabilities, increasing the affordability and efficiency of our vehicles, bringing new products to market and expanding our global infrastructure.

In 2022, we deployed 6.5 GWh of energy storage products and 348 megawatts of solar energy systems. We are currently focused on ramping production of energy storage products, improving our Solar Roof installation capability and efficiency, and increasing market share of retrofit and new build solar energy systems.

In 2022, we recognized total revenues of $81.46 billion, respectively, representing an increase of $27.64 billion, compared to the prior year. We continue to ramp production, build new manufacturing capacity and expand our operations to enable increased deliveries and deployments of our products and further revenue growth.

In 2022, our net income attributable to common stockholders was $12.56 billion, representing a favorable change of $7.04 billion, compared to the prior year. We continue to focus on improving our profitability through production and operational efficiencies.

We ended 2022 with $22.19 billion in cash and cash equivalents and investments, representing an increase of $4.48 billion from the end of 2021. Our cash flows provided by operating activities during 2022 and 2021 were $14.72 billion and $11.50 billion, respectively, representing an increase of $3.23 billion. Capital expenditures amounted to $7.16 billion during 2022, compared to $6.48 billion during 2021. Sustained growth has allowed our business to generally fund itself, and we will continue investing in a number of capital-intensive projects in upcoming periods.

Management Opportunities, Challenges and Uncertainties and 2023 Outlook

Automotive—Production

The following is a summary of the status of production of each of our announced vehicle models in production and under development, as of the date of this Annual Report on Form 10-K:

Production Location	Vehicle Model(s)	Production Status
Fremont Factory	Model S / Model X	Active
	Model 3 / Model Y	Active
Gigafactory Shanghai	Model 3 / Model Y	Active
Gigafactory Berlin-Brandenburg	Model Y	Active
Gigafactory Texas	Model Y	Active
	Cybertruck	Tooling
Gigafactory Nevada	Tesla Semi	Pilot production
TBD	Tesla Roadster	In development
TBD	Robotaxi & Others	In development

We are focused on growing our manufacturing capacity, which includes ramping all of our production vehicles to their installed production capacities as well as increasing production rate, efficiency and capacity at our current factories. The next phase of production growth will depend on the ramp at Gigafactory Berlin-Brandenburg and Gigafactory Texas, as well as our ability to add to our available sources of battery cell supply by manufacturing our own cells that we are developing to have high-volume output, lower capital and production costs and longer range. Our goals are to improve vehicle performance, decrease production costs and increase affordability.

However, these plans are subject to uncertainties inherent in establishing and ramping manufacturing operations, which may be exacerbated by the new product and manufacturing technologies we are introducing, the number of concurrent international projects, any industry-wide component constraints, labor shortages and any future impact from events outside of our control such as the COVID-19 pandemic. Moreover, we have set ambitious technological targets with our plans for battery cells as well as for iterative manufacturing and design improvements for our vehicles with each new factory.

Automotive—Demand and Sales

Our cost reduction efforts, cost innovation strategies, and additional localized procurement and manufacturing are key to our vehicles' affordability, and for example, have allowed us to competitively price our vehicles in China. We will also continue to generate demand and brand awareness by improving our vehicles' performance and functionality, including through products based on artificial intelligence such as Autopilot and FSD, and other software features, and delivering new vehicles, such as the Tesla Semi in December 2022. Moreover, we expect to continue to benefit from ongoing electrification of the automotive sector and increasing environmental awareness.

However, we operate in a cyclical industry that is sensitive to political and regulatory uncertainty, including with respect to trade and the environment, all of which can be compounded by inflationary pressures, rising energy prices, increases in interest rates and any future global impact from the COVID-19 pandemic. For example, in the earlier part of 2022, the automotive industry in general experienced part shortages and supplier disruptions which impacted production leading to a general increase in vehicle pricing. As the year progressed, inflationary pressures increased across the markets in which we operate. In an effort to curb this trend, central banks in developed countries raised interest rates rapidly and substantially, impacting the affordability of vehicle lease and finance arrangements. Further, sales of vehicles in the automotive industry also tend to be cyclical in many markets, which may expose us to increased volatility as we expand and adjust our operations. Moreover, as additional competitors enter the marketplace and help bring the world closer to sustainable transportation, we will have to adjust and continue to execute well to maintain our momentum. These macroeconomic and industry trends have had, and will likely continue to have, an impact on the pricing of, and order rate for our vehicles, and we will continue to adjust accordingly to such developments.

Automotive—Deliveries and Customer Infrastructure

As our production increases, we must work constantly to similarly increase vehicle delivery capability so that it does not become a bottleneck on our total deliveries. Beginning the second half of 2022, due to continuing challenges caused by vehicle transportation capacity during peak delivery periods, we began transitioning to a more even regional mix of vehicle builds each week, which led to an increase in cars in transit at the end of the year. Increasing the exports of vehicles manufactured at Gigafactory Shanghai has also been effective in mitigating the strain on our deliveries in markets outside of the United States, and we expect to benefit further from situating additional factories closer to local markets, including the production launch at Gigafactory Berlin-Brandenburg and Gigafactory Austin. As we expand our manufacturing operations globally, we will also have to continue to increase and staff our delivery, servicing and charging infrastructure accordingly, maintain our vehicle reliability and optimize our Supercharger locations to ensure cost effectiveness and customer satisfaction. In particular, we remain focused on increasing the capability and efficiency of our servicing operations.

Energy Generation and Storage Demand, Production and Deployment

The long-term success of this business is dependent upon increasing margins through greater volumes. We continue to increase the production of our energy storage products to meet high levels of demand. For Megapack, energy storage deployments can vary meaningfully quarter to quarter depending on the timing of specific project milestones. For Powerwall, better availability and growing grid stability concerns drive higher customer interest. We remain committed to growing our retrofit solar energy business by offering a low-cost and simplified online ordering experience. In addition, we continue to seek to improve our installation capabilities and price efficiencies for Solar Roof. As these product lines grow, we will have to maintain adequate battery cell supply for our energy storage products and hire additional personnel, particularly skilled electricians, to support the ramp of Solar Roof.

Cash Flow and Capital Expenditure Trends

Our capital expenditures are typically difficult to project beyond the short-term given the number and breadth of our core projects at any given time, and may further be impacted by uncertainties in future global market conditions. We are simultaneously ramping new products, ramping manufacturing facilities on three continents and piloting the development and manufacture of new battery cell technologies, and the pace of our capital spend may vary depending on overall priority among projects, the pace at which we meet milestones, production adjustments to and among our various products, increased capital efficiencies and the addition of new projects. Owing and subject to the foregoing as well as the pipeline of announced projects under development, all other continuing infrastructure growth and varying levels of inflation, we currently expect our capital expenditures to be between $6.00 to $8.00 billion in 2023 and between $7.00 to $9.00 billion in each of the following two fiscal years.

Our business has recently been consistently generating cash flow from operations in excess of our level of capital spend, and with better working capital management resulting in shorter days sales outstanding than days payable outstanding, our sales growth is also facilitating positive cash generation. We have and will continue to utilize such cash flows, among other things, to do more vertical integration, expand our product roadmap and provide financing options to our customers. On the other hand, we are likely to see heightened levels of capital expenditures during certain periods depending on the specific pace of our capital-intensive projects and rising material prices and increasing supply chain and labor expenses resulting from changes in global trade conditions and labor availability associated with the COVID-19 pandemic. Overall, we expect our ability to be self-funding to continue as long as macroeconomic factors support current trends in our sales.

Operating Expense Trends

As long as we see expanding sales, and excluding the potential impact of macroeconomic conditions including increased labor costs and impairment charges on certain assets as explained below, we generally expect operating expenses relative to revenues to decrease as we continue to increase operational efficiency and process automation. We expect operating expenses to continue to grow in 2023 as we are expanding our operations globally.

In the first quarter of 2021, we invested an aggregate $1.50 billion in bitcoin. As with any investment and consistent with how we manage fiat-based cash and cash-equivalent accounts, we may increase or decrease our holdings of digital assets at any time based on the needs of the business and our view of market and environmental conditions. Digital assets are considered indefinite-lived intangible assets under applicable accounting rules. Accordingly, any decrease in their fair values below our carrying values for such assets at any time subsequent to their acquisition will require us to recognize impairment charges, whereas we may make no upward revisions for any market price increases until a sale. For any digital assets held now or in the future, these charges may negatively impact our profitability in the periods in which such impairments occur even if the overall market values of these assets increase. For example, in the year ended December 31, 2022, we recorded $204 million of impairment losses resulting from changes to the carrying value of our bitcoin and gains of $64 million on certain conversions of bitcoin into fiat currency by us.

Critical Accounting Policies and Estimates

The consolidated financial statements are prepared in accordance with accounting principles generally accepted in the U.S. (“GAAP”). The preparation of the consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues, costs and expenses and related disclosures. We base our estimates on historical experience, as appropriate, and on various other assumptions that we believe to be reasonable under the circumstances. Changes in the accounting estimates are reasonably likely to occur from period to period. Accordingly, actual results could differ significantly from the estimates made by our management. We evaluate our estimates and assumptions on an ongoing basis. To the extent that there are material differences between these estimates and actual results, our future financial statement presentation, financial condition, results of operations and cash flows may be affected.

The estimates used for, but not limited to, determining significant economic incentive for resale value guarantee arrangements, sales return reserves, the collectability of accounts and financing receivables, inventory valuation, warranties, fair value of long-lived assets, goodwill, fair value of financial instruments, fair value and residual value of operating lease vehicles and solar energy systems subject to leases could be impacted. We have assessed the impact and are not aware of any specific events or circumstances that required an update to our estimates and assumptions or materially affected the carrying value of our assets or liabilities as of the date of issuance of this Annual Report on Form 10-K. These estimates may change as new events occur and additional information is obtained. Actual results could differ materially from these estimates under different assumptions or conditions.

Revenue Recognition

Automotive Sales

Automotive sales revenue includes revenues related to cash and financing deliveries of new vehicles, and specific other features and services that meet the definition of a performance obligation under Accounting Standards Codification ("ASC") 606, *Revenue from Contracts with Customers* ("ASC 606"), including access to our FSD features, internet connectivity, Supercharger network and over-the-air software updates. We recognize revenue on automotive sales upon delivery to the customer, which is when the control of a vehicle transfers. Payments are typically received at the point control transfers or in accordance with payment terms customary to the business, except sales we finance for which payments are collected over the contractual loan term. We also recognize a sales return reserve based on historical experience plus consideration for expected future market values, when we offer resale value guarantees or similar buyback terms. Other features and services such as access to our internet connectivity, legacy programs offering unlimited free Supercharging and over-the-air software updates are provisioned upon control transfer of a vehicle and recognized over time on a straight-line basis as we have a stand-ready obligation to deliver such services to the customer. Other limited free Supercharging incentives are recognized based on actual usage or expiration, whichever is earlier. We recognize revenue related to these other features and services over the performance period, which is generally the expected ownership life of the vehicle. Revenue related to FSD is recognized when functionality is delivered to the customer and the portion related to software updates is recognized over time. For our obligations related to automotive sales, we estimate standalone selling price by considering costs used to develop and deliver the service, third-party pricing of similar options and other information that may be available.

Any fees that are paid or payable by us to a customer's lender when we arrange the financing are recognized as an offset against automotive sales revenue. Costs to obtain a contract mainly relate to commissions paid to our sales personnel for the sale of vehicles. As our contract costs related to automotive sales are typically fulfilled within one year, the costs to obtain a contract are expensed as incurred. Amounts billed to customers related to shipping and handling are classified as automotive sales revenue, and we have elected to recognize the cost for freight and shipping when control over vehicles, parts or accessories have transferred to the customer as an expense in cost of automotive sales revenue. Our policy is to exclude taxes collected from a customer from the transaction price of automotive contracts.

We offer resale value guarantees or similar buy-back terms to certain international customers who purchase vehicles and who finance their vehicles through one of our specified commercial banking partners. Under these programs, we receive full payment for the vehicle sales price at the time of delivery and our counterparty has the option of selling their vehicle back to us during the guarantee period, which currently is generally at the end of the term of the applicable loan or financing program, for a pre-determined resale value. We account for such automotive sales as a sale with a right of return when we do not believe the customer has a significant economic incentive to exercise the resale value guarantee provided to them at contract inception. The process to determine whether there is a significant economic incentive includes a comparison of a vehicle's estimated market value at the time the option is exercisable with the guaranteed resale value to determine the customer's economic incentive to exercise. On a quarterly basis, we assess the estimated market values of vehicles sold with resale value guarantees to determine whether there have been changes to the likelihood of future product returns. As we accumulate more data related to the resale values of our vehicles or as market conditions change, there may be material changes to their estimated values.

Inventory Valuation

Inventories are stated at the lower of cost or net realizable value. Cost is computed using standard cost for vehicles and energy products, which approximates actual cost on a first-in, first-out basis. We record inventory write-downs for excess or obsolete inventories based upon assumptions about current and future demand forecasts. If our inventory on-hand is in excess of our future demand forecast, the excess amounts are written-off.

We also review our inventory to determine whether its carrying value exceeds the net amount realizable upon the ultimate sale of the inventory. This requires us to determine the estimated selling price of our vehicles less the estimated cost to convert the inventory on-hand into a finished product. Once inventory is written-down, a new, lower cost basis for that inventory is established and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis.

Should our estimates of future selling prices or production costs change, additional and potentially material write-downs may be required. A small change in our estimates may result in a material charge to our reported financial results.

Warranties

We provide a manufacturer's warranty on all new and used vehicles and a warranty on the installation and components of the energy generation and storage systems we sell for periods typically between 10 to 25 years. We accrue a warranty reserve for the products sold by us, which includes our best estimate of the projected costs to repair or replace items under warranties and recalls if identified. These estimates are based on actual claims incurred to date and an estimate of the nature, frequency and costs of future claims. These estimates are inherently uncertain given our relatively short history of sales, and changes to our historical or projected warranty experience may cause material changes to the warranty reserve in the future. The warranty reserve does not include projected warranty costs associated with our vehicles subject to operating lease accounting and our solar energy systems under lease contracts or PPAs, as the costs to repair these warranty claims are expensed as incurred. The portion of the warranty reserve expected to be incurred within the next 12 months is included within Accrued liabilities and other, while the remaining balance is included within Other long-term liabilities on the consolidated balance sheets. Warranty expense is recorded as a component of Cost of revenues in the consolidated statements of operations. Due to the magnitude of our automotive business, accrued warranty balance is primarily related to our automotive segment.

Stock-Based Compensation

We use the fair value method of accounting for our stock options and restricted stock units ("RSUs") granted to employees and for our employee stock purchase plan (the "ESPP") to measure the cost of employee services received in exchange for the stock-based awards. The fair value of stock option awards with only service and/or performance conditions is estimated on the grant or offering date using the Black-Scholes option-pricing model. The Black-Scholes option-pricing model requires inputs such as the risk-free interest rate, expected term and expected volatility. These inputs are subjective and generally require significant judgment. The fair value of RSUs is measured on the grant date based on the closing fair market value of our common stock. The resulting cost is recognized over the period during which an employee is required to provide service in exchange for the awards, usually the vesting period, which is generally four years for stock options and RSUs and six months for the ESPP. Stock-based compensation expense is recognized on a straight-line basis, net of actual forfeitures in the period.

For performance-based awards, stock-based compensation expense is recognized over the expected performance achievement period of individual performance milestones when the achievement of each individual performance milestone becomes probable.

As we accumulate additional employee stock-based awards data over time and as we incorporate market data related to our common stock, we may calculate significantly different volatilities and expected lives, which could materially impact the valuation of our stock-based awards and the stock-based compensation expense that we will recognize in future periods. Stock-based compensation expense is recorded in Cost of revenues, Research and development expense and Selling, general and administrative expense in the consolidated statements of operations.

Income Taxes

We are subject to taxes in the U.S. and in many foreign jurisdictions. Significant judgment is required in determining our provision for income taxes, our deferred tax assets and liabilities and any valuation allowance recorded against our net deferred tax assets. We make these estimates and judgments about our future taxable income that are based on assumptions that are consistent with our future plans. Tax laws, regulations and administrative practices may be subject to change due to economic or political conditions including fundamental changes to the tax laws applicable to corporate multinationals. The U.S., many countries in the European Union and a number of other countries are actively considering changes in this regard. As of December 31, 2022, we had recorded a full valuation allowance on our net U.S. deferred tax assets because we expect that it is more likely than not that our U.S. deferred tax assets will not be realized. Should the actual amounts differ from our estimates, the amount of our valuation allowance could be materially impacted.

Furthermore, significant judgment is required in evaluating our tax positions. In the ordinary course of business, there are many transactions and calculations for which the ultimate tax settlement is uncertain. As a result, we recognize the effect of this uncertainty on our tax attributes or taxes payable based on our estimates of the eventual outcome. These effects are recognized when, despite our belief that our tax return positions are supportable, we believe that it is more likely than not that some of those positions may not be fully sustained upon review by tax authorities. We are required to file income tax returns in the U.S. and various foreign jurisdictions, which requires us to interpret the applicable tax laws and regulations in effect in such jurisdictions. Such returns are subject to audit by the various federal, state and foreign taxing authorities, who may disagree with respect to our tax positions. We believe that our consideration is adequate for all open audit years based on our assessment of many factors, including past experience and interpretations of tax law. We review and update our estimates in light of changing facts and circumstances, such as the closing of a tax audit, the lapse of a statute of limitations or a change in estimate. To the extent that the final tax outcome of these matters differs from our expectations, such differences may impact income tax expense in the period in which such determination is made. The eventual impact on our income tax expense depends in part if we still have a valuation allowance recorded against our deferred tax assets in the period that such determination is made.

Results of Operations

Revenues

(Dollars in millions)	Year Ended December 31, 2022	2021	2020	2022 vs. 2021 Change $	%	2021 vs. 2020 Change $	%
Automotive sales	$ 67,210	$ 44,125	$ 24,604	$ 23,085	52 %	$ 19,521	79 %
Automotive regulatory credits	1,776	1,465	1,580	311	21 %	(115)	(7)%
Automotive leasing	2,476	1,642	1,052	834	51 %	590	56 %
Total automotive revenues	71,462	47,232	27,236	24,230	51 %	19,996	73 %
Services and other	6,091	3,802	2,306	2,289	60 %	1,496	65 %
Total automotive & services and other segment revenue	77,553	51,034	29,542	26,519	52 %	21,492	73 %
Energy generation and storage segment revenue	3,909	2,789	1,994	1,120	40 %	795	40 %
Total revenues	$ 81,462	$ 53,823	$ 31,536	$ 27,639	51 %	$ 22,287	71 %

Automotive & Services and Other Segment

Automotive sales revenue includes revenues related to cash and financing deliveries of new Model S, Model X, Semi, Model 3, and Model Y vehicles, including access to our FSD features, internet connectivity, free Supercharging programs and over-the-air software updates. These deliveries are vehicles that are not subject to lease accounting.

Automotive regulatory credits includes sales of regulatory credits to other automotive manufacturers. Our revenue from automotive regulatory credits is directly related to our new vehicle production, sales and pricing negotiated with our customers. We monetize them proactively as new vehicles are sold based on standing arrangements with buyers of such credits, typically as close as possible to the production and delivery of the vehicle or changes in regulation impacting the credits.

Automotive leasing revenue includes the amortization of revenue for vehicles under direct operating lease agreements. Additionally, automotive leasing revenue includes direct sales-type leasing programs where we recognize all revenue associated with the sales-type lease upon delivery to the customer.

Services and other revenue consists of non-warranty after-sales vehicle services and parts, paid Supercharging, sales of used vehicles, retail merchandise and vehicle insurance revenue.

<u>2022 compared to 2021</u>

Automotive sales revenue increased $23.09 billion, or 52%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to an increase of 347,024 Model 3 and Model Y deliveries, and an increase of 38,183 Model S and Model X deliveries year over year. This was achieved from production ramping of Model Y at Gigafactory Shanghai and the Fremont Factory as well as the start of production at Gigafactory Berlin-Brandenburg and Gigafactory Texas in 2022, at a higher combined average selling price from a higher proportion of Model Y sales despite a negative impact from the United States dollar strengthening against other foreign currencies in 2022 compared to the prior period. There was also an increase in production of Model S and Model X and an increase in the combined average selling price of Model S and Model X with a higher proportion of Model X sales, compared to the prior period as deliveries of the new versions of Model S and Model X began ramping in the second and fourth quarters of 2021, respectively. Further, during the fourth quarter of 2022, we recognized $324 million in revenue related to the general FSD feature release in North America.

Automotive regulatory credits revenue increased $311 million, or 21%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to changes in regulation which entitled us to additional consideration of $288 million in revenue in the first quarter of 2022 for credits sold previously, in the absence of which we had only an immaterial increase in automotive regulatory credits revenue.

Automotive leasing revenue increased $834 million, or 51%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The change is primarily due to an increase in activities under our direct operating lease program as well as an increase in direct sales-type leasing revenue.

Services and other revenue increased $2.29 billion, or 60%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The change is primarily due to increase in used vehicle revenue driven by increases in volume and average selling prices of used Tesla and non-Tesla vehicles, non-warranty maintenance services revenue as our fleet continues to grow, paid Supercharging revenue, insurance services revenue and retail merchandise revenue.

Energy Generation and Storage Segment

Energy generation and storage revenue includes sales and leasing of solar energy generation and energy storage products, financing of solar energy generation products, services related to such products and sales of solar energy systems incentives.

2022 compared to 2021

Energy generation and storage revenue increased $1.12 billion, or 40%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to an increase in energy storage deployments of Megapack, Powerwall and higher average selling price of Megapack, as well as on solar cash and loan deployments driven by price increases in 2022.

Cost of Revenues and Gross Margin

	Year Ended December 31,			2022 vs. 2021 Change		2021 vs. 2020 Change	
(Dollars in millions)	2022	2021	2020	$	%	$	%
Cost of revenues							
Automotive sales	$ 49,599	$ 32,415	$ 19,696	$ 17,184	53 %	$ 12,719	65 %
Automotive leasing	1,509	978	563	531	54 %	415	74 %
Total automotive cost of revenues	51,108	33,393	20,259	17,715	53 %	13,134	65 %
Services and other	5,880	3,906	2,671	1,974	51 %	1,235	46 %
Total automotive & services and other segment cost of revenues	56,988	37,299	22,930	19,689	53 %	14,369	63 %
Energy generation and storage segment	3,621	2,918	1,976	703	24 %	942	48 %
Total cost of revenues	$ 60,609	$ 40,217	$ 24,906	$ 20,392	51 %	$ 15,311	61 %
Gross profit total automotive	$ 20,354	$ 13,839	$ 6,977				
Gross margin total automotive	28.5 %	29.3 %	25.6 %				
Gross profit total automotive & services and other segment	$ 20,565	$ 13,735	$ 6,612				
Gross margin total automotive & services and other segment	26.5 %	26.9 %	22.4 %				
Gross profit energy generation and storage segment	$ 288	$ (129)	$ 18				
Gross margin energy generation and storage segment	7.4 %	(4.6)%	0.9 %				
Total gross profit	$ 20,853	$ 13,606	$ 6,630				
Total gross margin	25.6 %	25.3 %	21.0 %				

Automotive & Services and Other Segment

Cost of automotive sales revenue includes direct and indirect materials, labor costs, manufacturing overhead, including depreciation costs of tooling and machinery, shipping and logistic costs, vehicle connectivity costs, allocations of electricity and infrastructure costs related to our free Supercharging programs and reserves for estimated warranty expenses. Cost of automotive sales revenues also includes adjustments to warranty expense and charges to write down the carrying value of our inventory when it exceeds its estimated net realizable value and to provide for obsolete and on-hand inventory in excess of forecasted demand.

Cost of automotive leasing revenue includes the depreciation of operating lease vehicles, cost of goods sold associated with direct sales-type leases and warranty expense related to leased vehicles. Cost of automotive leasing revenue also includes vehicle connectivity costs and allocations of electricity and infrastructure costs related to our Supercharger network for vehicles under our leasing programs.

Cost of services and other revenue includes costs associated with providing non-warranty after-sales services and parts, costs of paid Supercharging, cost of used vehicles including refurbishment costs, costs for retail merchandise, and costs to provide vehicle insurance.

2022 compared to 2021

Cost of automotive sales revenue increased $17.18 billion, or 53%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, in line with the growth in revenue year over year, as discussed above. The average combined cost per unit of Model 3 and Model Y increased year over year due to rising raw material, logistics and warranty costs. There were also idle capacity charges of $306 million primarily related to the temporary suspension of production at Gigafactory Shanghai as well as the ramping up of production in Gigafactory Texas and our proprietary battery cells manufacturing during the year ended December 31, 2022. We had also incurred costs related to the ramp up of production in Gigafactory Berlin-Brandenburg during the year ended December 31, 2022. These increases were partially offset by a decrease in combined average Model S and Model X costs per unit driven by lower average cost for the new versions from ramping up production. Further, these increases in costs of revenue were positively impacted by the United States dollar strengthening against other foreign currencies in 2022 compared to the prior period.

Cost of automotive leasing revenue increased $531 million, or 54%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to an increase in cumulative vehicles under our direct operating lease program and an increase in direct sales-type leasing cost of revenues from more activities in the current year.

Cost of services and other revenue increased $1.97 billion, or 51%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The change is primarily due to an increase in used vehicle cost of revenue driven by increases in volume and costs of used Tesla and non-Tesla vehicle sales, an increase in non-warranty maintenance service revenue, and an increase in costs of paid Supercharging, insurance services and retail merchandise.

Gross margin for total automotive decreased from 29.3% to 28.5% in the year ended December 31, 2022 as compared to the year ended December 31, 2021. This was driven by the changes in automotive sales revenue and cost of automotive sales revenue, partially offset by an increase in regulatory credits revenue, as discussed earlier.

Gross margin for total automotive & services and other segment decreased from 26.9% to 26.5% in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to the automotive gross margin decrease discussed above, partially offset by an improvement in our services and other gross margin. Additionally, services and other was a higher percentage of the segment gross margin during the year ended 2022 as compared to the prior year.

Energy Generation and Storage Segment

Cost of energy generation and storage revenue includes direct and indirect material and labor costs, warehouse rent, freight, warranty expense, other overhead costs and amortization of certain acquired intangible assets. Cost of energy generation and storage revenue also includes charges to write down the carrying value of our inventory when it exceeds its estimated net realizable value and to provide for obsolete and on-hand inventory in excess of forecasted demand. In agreements for solar energy system and PPAs where we are the lessor, the cost of revenue is primarily comprised of depreciation of the cost of leased solar energy systems, maintenance costs associated with those systems and amortization of any initial direct costs.

2022 compared to 2021

Cost of energy generation and storage revenue increased $703 million, or 24%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to increases in energy storage deployments of Megapack and Powerwall, as well as higher average cost of solar cash and loan deployments due to increased component costs.

Gross margin for energy generation and storage increased from -4.6% to 7.4% in the year ended December 31, 2022 as compared to the year ended December 31, 2021. This was driven by the growth in energy generation and storage revenue and cost of energy generation and storage revenue as discussed above. Additionally, there was a higher proportion of energy storage sales, which operated at a higher gross margin, within the segment.

Research and Development Expense

	Year Ended December 31,			2022 vs. 2021 Change		2021 vs. 2020 Change	
(Dollars in millions)	2022	2021	2020	$	%	$	%
Research and development	$ 3,075	$ 2,593	$ 1,491	$ 482	19 %	$ 1,102	74 %
As a percentage of revenues	4 %	5 %	5 %				

Research and development ("R&D") expenses consist primarily of personnel costs for our teams in engineering and research, manufacturing engineering and manufacturing test organizations, prototyping expense, contract and professional services and amortized equipment expense.

R&D expenses increased $482 million, or 19%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The increase was primarily due to a $175 million increase in employee and labor related expenses, a $132 million increase in facilities, outside services, freight and depreciation expense, a $101 million increase in R&D expensed materials and an $87 million increase in stock-based compensation expense. These increases were to support our expanding product roadmap and technologies including our proprietary battery cells. Further, there were additional R&D expenses in the first quarter of 2022 as we were in the pre-production phase at Gigafactory Texas and started production at Gigafactory Berlin-Brandenburg only closer to the end of the first quarter of 2022.

R&D expenses as a percentage of revenue decreased from 5% to 4% in the year ended December 31, 2022 as compared to the year ended December 31, 2021. Our R&D expenses have decreased as a proportion of total revenues despite expanding product roadmap and technologies.

Selling, General and Administrative Expense

	Year Ended December 31,			2022 vs. 2021 Change		2021 vs. 2020 Change	
(Dollars in millions)	2022	2021	2020	$	%	$	%
Selling, general and administrative	$ 3,946	$ 4,517	$ 3,145	$ (571)	(13)%	$ 1,372	44 %
As a percentage of revenues	5 %	8 %	10 %				

Selling, general and administrative ("SG&A") expenses generally consist of personnel and facilities costs related to our stores, marketing, sales, executive, finance, human resources, information technology and legal organizations, as well as fees for professional and contract services and litigation settlements.

SG&A expenses decreased $571 million, or 13%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. This is primarily due to a decrease of $822 million in stock-based compensation expense, most of which is attributable to the lower stock-based compensation expense of $844 million on the 2018 CEO Performance Award. This was partially offset by the overall growth in stock-based compensation due to increased headcount. See Note 13, *Equity Incentive Plans*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K. There was also a decrease of $87 million in overall employee and labor related expenses driven by a decrease of $340 million of additional payroll tax due to our CEO's option exercises from the 2012 CEO Performance Award in 2021, partially offset by an increase in other employee and labor costs from increased headcount. These decreases were partially offset by an increase of $222 million in facilities-related expenses, and an increase of $117 million in professional services, sales and marketing activities and other costs.

SG&A expenses as a percentage of revenue decreased from 8% to 5% in the year ended December 31, 2022 as compared to the year ended December 31, 2021. Our SG&A expenses have decreased as a proportion of total revenues due to the decrease in expenses as discussed above, in addition to operational efficiencies.

Restructuring and Other Expense

	Year Ended December 31,			2022 vs. 2021 Change		2021 vs. 2020 Change	
(Dollars in millions)	2022	2021	2020	$	%	$	%
Restructuring and other	$ 176	$ (27)	$ —	$ 203	Not meaningful	$ (27)	Not meaningful

During the years ended December 31, 2022 and 2021, we recorded $204 million and $101 million, respectively, of impairment losses on digital assets, respectively. During the years ended December 31, 2022 and 2021, we also realized gains of $64 million and $128 million, respectively, in connection with converting our holdings of digital assets into fiat currency. See Note 3, *Digital Assets, Net*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for further details. Additionally, we recorded other expenses of $36 million during the second quarter of the year ended December 31, 2022, related to employee terminations.

Interest Income

(Dollars in millions)	Year Ended December 31, 2022	2021	2020	2022 vs. 2021 Change $	%	2021 vs. 2020 Change $	%
Interest income	$ 297	$ 56	$ 30	$ 241	430 %	$ 26	87 %

Interest income increased $241 million, or 430%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. This increase was primarily due to higher interest earned on our cash and cash equivalents and short-term investments during the year ended 2022 compared to the prior period. This was driven by an increase in our average cash and cash equivalents and short-term investments balance and rising interest rates.

Interest Expense

(Dollars in millions)	Year Ended December 31, 2022	2021	2020	2022 vs. 2021 Change $	%	2021 vs. 2020 Change $	%
Interest expense	$ (191)	$ (371)	$ (748)	$ 180	(49)%	$ 377	(50)%

Interest expense decreased $180 million, or 49%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. This decrease was primarily due to the continued reduction in our overall debt balance offset by lower capitalized interest. See Note 11, *Debt*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for further details.

Other (Expense) Income, Net

(Dollars in millions)	Year Ended December 31, 2022	2021	2020	2022 vs. 2021 Change $	%	2021 vs. 2020 Change $	%
Other (expense) income, net	$ (43)	$ 135	$ (122)	$ (178)	Not meaningful	$ 257	Not meaningful

Other (expense) income, net, consists primarily of foreign exchange gains and losses related to our foreign currency-denominated monetary assets and liabilities. We expect our foreign exchange gains and losses will vary depending upon movements in the underlying exchange rates.

Other (expense) income, net, changed unfavorably by $178 million in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The change is primarily due to fluctuations in foreign currency exchange rates.

Provision for Income Taxes

(Dollars in millions)	Year Ended December 31, 2022	2021	2020	2022 vs. 2021 Change $	%	2021 vs. 2020 Change $	%
Provision for income taxes	$ 1,132	$ 699	$ 292	$ 433	62 %	$ 407	139 %
Effective tax rate	8 %	11 %	25 %				

Our provision for income taxes increased by $433 million, or 62%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to the increase in our pre-tax income year over year.

Our effective tax rate decreased from 11% to 8% in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to changes in mix of jurisdictional earnings.

See Note 14, *Income Taxes*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for further details.

Net Income Attributable to Noncontrolling Interests and Redeemable Noncontrolling Interests

(Dollars in millions)	Year Ended December 31, 2022	2021	2020	2022 vs. 2021 Change $	%	2021 vs. 2020 Change $	%
Net income attributable to noncontrolling interests and redeemable noncontrolling interests in subsidiaries	$ 31	$ 125	$ 141	$ (94)	(75)%	$ (16)	(11)%

Net income attributable to noncontrolling interests and redeemable noncontrolling interests decreased by $94 million, or 75%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. These changes were due to a decrease in allocations to financing fund investors.

Liquidity and Capital Resources

We expect to continue to generate net positive operating cash flow as we have done in the last four fiscal years. The cash we generate from our core operations enables us to fund ongoing operations and production, our research and development projects for new products and technologies including our proprietary battery cells, additional manufacturing ramps at existing manufacturing facilities such as the Fremont Factory, Gigafactory Nevada, Gigafactory Shanghai and Gigafactory New York, the ramp of Gigafactory Berlin-Brandenburg and Gigafactory Texas and the continued expansion of our retail and service locations, body shops, Mobile Service fleet, Supercharger network and energy product installation capabilities.

In addition, because a large portion of our future expenditures will be to fund our growth, we expect that if needed we will be able to adjust our capital and operating expenditures by operating segment. For example, if our near-term manufacturing operations decrease in scale or ramp more slowly than expected, including due to global economic or business conditions, we may choose to correspondingly slow the pace of our capital expenditures. Finally, we continually evaluate our cash needs and may decide it is best to raise additional capital or seek alternative financing sources to fund the rapid growth of our business, including through drawdowns on existing or new debt facilities or financing funds. Conversely, we may also from time to time determine that it is in our best interests to voluntarily repay certain indebtedness early.

Accordingly, we believe that our current sources of funds will provide us with adequate liquidity during the 12-month period following December 31, 2022, as well as in the long-term.

See the sections below for more details regarding the material requirements for cash in our business and our sources of liquidity to meet such needs.

Material Cash Requirements

From time to time in the ordinary course of business, we enter into agreements with vendors for the purchase of components and raw materials to be used in the manufacture of our products. However, due to contractual terms, variability in the precise growth curves of our development and production ramps, and opportunities to renegotiate pricing, we generally do not have binding and enforceable purchase orders under such contracts beyond the short-term, and the timing and magnitude of purchase orders beyond such period is difficult to accurately project.

As discussed in and subject to the considerations referenced in Part II, Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations—Management Opportunities, Challenges and Risks and 2023 Outlook—Cash Flow and Capital Expenditure Trends* in this Annual Report on Form 10-K, we currently expect our capital expenditures to support our projects globally to be between $6.00 to $8.00 billion in 2023 and between $7.00 to $9.00 billion in each of the following two fiscal years. In connection with our operations at Gigafactory New York, we have an agreement to spend or incur $5.00 billion in combined capital, operational expenses, costs of goods sold and other costs in the State of New York through December 31, 2029 (pursuant to a deferral of our required timelines to meet such obligations that was granted in April 2021, and which was memorialized in an amendment to our agreement with the SUNY Foundation in August 2021). We also have an operating lease arrangement with the local government of Shanghai pursuant to which we are required to spend RMB 14.08 billion in capital expenditures at Gigafactory Shanghai by the end of 2023. For details regarding these obligations, refer to Note 15, *Commitments and Contingencies*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

As of December 31, 2022, we and our subsidiaries had outstanding $2.06 billion in aggregate principal amount of indebtedness, of which $1.02 billion is scheduled to become due in the succeeding 12 months. As of December 31, 2022, our total minimum lease payments was $4.28 billion, of which $1.14 billion is due in the succeeding 12 months. For details regarding our indebtedness and lease obligations, refer to Note 11, *Debt*, and Note 12, *Leases*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Sources and Conditions of Liquidity

Our sources to fund our material cash requirements are predominantly from our deliveries and servicing of new and used vehicles, sales and installations of our energy storage products and solar energy systems, proceeds from debt facilities and proceeds from equity offerings, when applicable.

As of December 31, 2022, we had $16.25 billion and $5.93 billion of cash and cash equivalents and short-term investments, respectively. Balances held in foreign currencies had a U.S. dollar equivalent of $3.42 billion and consisted primarily of Chinese yuan, euros and British pounds. In addition, we had $2.42 billion of unused committed amounts under our credit facilities as of December 31, 2022, which included $2.27 billion under our Credit Agreement which was terminated in January 2023. Certain of such unused committed amounts are subject to satisfying specified conditions prior to draw-down (such as pledging to our lenders sufficient amounts of qualified receivables, inventories, leased vehicles and our interests in those leases, solar energy systems and the associated customer contracts or various other assets). In January 2023, we entered into an unsecured revolving credit facility providing for a commitment of up to $5.0 billion. For details regarding our indebtedness, refer to Note 11*, Debt*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

We continue adapting our strategy to meet our liquidity and risk objectives, such as investing in U.S. government and other investments, to do more vertical integration, expand our product roadmap and provide financing options to our customers.

Summary of Cash Flows

	Year Ended December 31,		
(Dollars in millions)	2022	2021	2020
Net cash provided by operating activities	$ 14,724	$ 11,497	$ 5,943
Net cash used in investing activities	$ (11,973)	$ (7,868)	$ (3,132)
Net cash (used in) provided by financing activities	$ (3,527)	$ (5,203)	$ 9,973

Cash Flows from Operating Activities

Our cash flows from operating activities are significantly affected by our cash investments to support the growth of our business in areas such as research and development and selling, general and administrative and working capital. Our operating cash inflows include cash from vehicle sales and related servicing, customer lease and financing payments, customer deposits, cash from sales of regulatory credits and energy generation and storage products. These cash inflows are offset by our payments to suppliers for production materials and parts used in our manufacturing process, operating expenses, operating lease payments and interest payments on our financings.

Net cash provided by operating activities increased by $3.23 billion to $14.72 billion during the year ended December 31, 2022 from $11.50 billion during the year ended December 31, 2021. This increase was primarily due to the increase in net income excluding non-cash expenses, gains and losses of $7.65 billion, offset by the overall increase in net operating assets and liabilities of $4.43 billion. The increase in our net operating assets and liabilities was mainly driven by a larger increase of inventory in the year ended December 31, 2022 as compared to the year ended December 31, 2021, partially offset by a larger increase of accounts payable and accrued liabilities, to support the ramp up in production at our factories and larger increases in other non-current assets and prepaid expenses and other current assets. Additionally, the increase in our net operating assets and other liabilities was partially offset by a larger increase in other long-term liabilities as compared to the prior year.

Cash Flows from Investing Activities

Cash flows from investing activities and their variability across each period related primarily to capital expenditures, which were $7.16 billion for the year ended December 31, 2022 and $6.48 billion for the year ended December 31, 2021, mainly for the expansions of Gigafactory Texas, the Fremont Factory, Gigafactory Berlin-Brandenburg, and Gigafactory Shanghai. We also purchased $5.84 billion of investments in the year ended December 31, 2022. Additionally, cash inflows related to sales of digital assets were $936 million in the year ended December 31, 2022, and net cash outflows related to digital assets were $1.23 billion in the year ended December 31, 2021 from purchases of digital assets for $1.50 billion offset by proceeds from sales of digital assets of $272 million.

Cash Flows from Financing Activities

Net cash used in financing activities decreased by $1.68 billion to $3.53 billion during the year ended December 31, 2022 from $5.20 billion during the year ended December 31, 2021. The decrease was primarily due to a $1.92 billion decrease in repayments of convertible and other debt, net of proceeds from issuances of debt. See Note 11, *Debt*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for further details regarding our debt obligations.

Recent Accounting Pronouncements

See Note 2, *Summary of Significant Accounting Policies*, to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Foreign Currency Risk

We transact business globally in multiple currencies and hence 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 (primarily the Chinese yuan, euro, pound sterling and Norwegian krone in relation to our current year operations). In general, we are a net receiver of currencies other than the U.S. dollar for our foreign subsidiaries. Accordingly, changes in exchange rates affect our revenue and other operating results as expressed in U.S. dollars as we do not typically hedge foreign currency risk.

We have also experienced, and will continue to experience, fluctuations in our net income as a result of gains (losses) on the settlement and the re-measurement of monetary assets and liabilities denominated in currencies that are not the local currency (primarily consisting of our intercompany and cash and cash equivalents balances).

We considered the historical trends in foreign currency exchange rates and determined that it is reasonably possible that adverse changes in foreign currency exchange rates of 10% for all currencies could be experienced in the near-term. These changes were applied to our total monetary assets and liabilities denominated in currencies other than our local currencies at the balance sheet date to compute the impact these changes would have had on our net income before income taxes. These changes would have resulted in a gain or loss of $473 million at December 31, 2022 and $277 million at December 31, 2021, assuming no foreign currency hedging.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Index to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Tesla, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Tesla, Inc. and its subsidiaries (the "Company") as of December 31, 2022 and 2021, and the related consolidated statements of operations, of comprehensive income, of redeemable noncontrolling interests and equity and of cash flows for each of the three years in the period ended December 31, 2022, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Changes in Accounting Principles

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for convertible debt in 2021.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Automotive Warranty Reserve

As described in Note 2 to the consolidated financial statements, total accrued warranty, which primarily relates to the automotive segment, was $3,505 million as of December 31, 2022. The Company provides a manufacturer’s warranty on all new and used Tesla vehicles. A warranty reserve is accrued for these products sold, which includes management’s best estimate of the projected costs to repair or replace items under warranty and recalls if identified. These estimates are based on actual claims incurred to date and an estimate of the nature, frequency and costs of future claims.

The principal considerations for our determination that performing procedures relating to the automotive warranty reserve is a critical audit matter are the significant judgment by management in determining the automotive warranty reserve for certain Tesla vehicle models; this in turn led to significant auditor judgment, subjectivity, and effort in performing procedures to evaluate management’s significant assumptions related to the nature, frequency and costs of future claims for certain Tesla vehicle models, and the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management’s estimate of the automotive warranty reserve for certain Tesla vehicle models, including controls over management’s significant assumptions related to the nature, frequency and costs of future claims as well as the completeness and accuracy of actual claims incurred to date. These procedures also included, among others, performing one of the following: (i) testing management’s process for determining the automotive warranty reserve for certain Tesla vehicle models or (ii) developing an independent estimate of the automotive warranty reserve for certain Tesla vehicle models and comparing the independent estimate to management’s estimate to evaluate the reasonableness of the estimate. Testing management’s process involved evaluating the reasonableness of significant assumptions related to the nature and frequency of future claims and the related costs to repair or replace items under warranty. Evaluating the assumptions related to the nature and frequency of future claims and the related costs to repair or replace items under warranty involved evaluating whether the assumptions used were reasonable by performing a lookback analysis comparing prior period forecasted claims to actual claims incurred. Developing the independent estimate involved testing the completeness and accuracy of historical vehicle claims processed and testing that such claims were appropriately used by management in the estimation of future claims. Professionals with specialized skill and knowledge were used to assist in developing an independent estimate of the automotive warranty reserve for certain Tesla vehicle models and in evaluating the appropriateness of certain aspects of management’s significant assumptions related to the nature and frequency of future claims.

/s/ PricewaterhouseCoopers LLP

San Jose, California
January 30, 2023

We have served as the Company’s auditor since 2005.

Tesla, Inc.

Consolidated Balance Sheets
(in millions, except per share data)

	December 31, 2022	December 31, 2021
Assets		
Current assets		
Cash and cash equivalents	$ 16,253	$ 17,576
Short-term investments	5,932	131
Accounts receivable, net	2,952	1,913
Inventory	12,839	5,757
Prepaid expenses and other current assets	2,941	1,723
Total current assets	40,917	27,100
Operating lease vehicles, net	5,035	4,511
Solar energy systems, net	5,489	5,765
Property, plant and equipment, net	23,548	18,884
Operating lease right-of-use assets	2,563	2,016
Digital assets, net	184	1,260
Intangible assets, net	215	257
Goodwill	194	200
Other non-current assets	4,193	2,138
Total assets	$ 82,338	$ 62,131
Liabilities		
Current liabilities		
Accounts payable	$ 15,255	$ 10,025
Accrued liabilities and other	7,142	5,719
Deferred revenue	1,747	1,447
Customer deposits	1,063	925
Current portion of debt and finance leases	1,502	1,589
Total current liabilities	26,709	19,705
Debt and finance leases, net of current portion	1,597	5,245
Deferred revenue, net of current portion	2,804	2,052
Other long-term liabilities	5,330	3,546
Total liabilities	36,440	30,548
Commitments and contingencies (Note 15)		
Redeemable noncontrolling interests in subsidiaries	409	568
Equity		
Stockholders' equity		
Preferred stock; $0.001 par value; 100 shares authorized; no shares issued and outstanding	—	—
Common stock; $0.001 par value; 6,000 shares authorized; 3,164 and 3,100 shares issued and outstanding as of December 31, 2022 and December 31, 2021, respectively (1)	3	3
Additional paid-in capital	32,177	29,803
Accumulated other comprehensive (loss) income	(361)	54
Retained earnings (1)	12,885	329
Total stockholders' equity	44,704	30,189
Noncontrolling interests in subsidiaries	785	826
Total liabilities and equity	$ 82,338	$ 62,131

(1) Prior period results have been adjusted to reflect the three-for-one stock split effected in the form of a stock dividend in August 2022. See Note 1, *Overview*, for details.

The accompanying notes are an integral part of these consolidated financial statements.

Tesla, Inc.

Consolidated Statements of Operations
(in millions, except per share data)

	Year Ended December 31,		
	2022	2021	2020
Revenues			
Automotive sales	$ 67,210	$ 44,125	$ 24,604
Automotive regulatory credits	1,776	1,465	1,580
Automotive leasing	2,476	1,642	1,052
Total automotive revenues	71,462	47,232	27,236
Energy generation and storage	3,909	2,789	1,994
Services and other	6,091	3,802	2,306
Total revenues	81,462	53,823	31,536
Cost of revenues			
Automotive sales	49,599	32,415	19,696
Automotive leasing	1,509	978	563
Total automotive cost of revenues	51,108	33,393	20,259
Energy generation and storage	3,621	2,918	1,976
Services and other	5,880	3,906	2,671
Total cost of revenues	60,609	40,217	24,906
Gross profit	20,853	13,606	6,630
Operating expenses			
Research and development	3,075	2,593	1,491
Selling, general and administrative	3,946	4,517	3,145
Restructuring and other	176	(27)	—
Total operating expenses	7,197	7,083	4,636
Income from operations	13,656	6,523	1,994
Interest income	297	56	30
Interest expense	(191)	(371)	(748)
Other (expense) income, net	(43)	135	(122)
Income before income taxes	13,719	6,343	1,154
Provision for income taxes	1,132	699	292
Net income	12,587	5,644	862
Net income attributable to noncontrolling interests and redeemable noncontrolling interests in subsidiaries	31	125	141
Net income attributable to common stockholders	$ 12,556	$ 5,519	$ 721
Net income per share of common stock attributable to common stockholders (1)			
Basic	$ 4.02	$ 1.87	$ 0.25
Diluted	$ 3.62	$ 1.63	$ 0.21
Weighted average shares used in computing net income per share of common stock (1)			
Basic	3,130	2,959	2,798
Diluted	3,475	3,386	3,249

(1) Prior period results have been adjusted to reflect the three-for-one stock split effected in the form of a stock dividend in August 2022. See Note 1, *Overview*, for details.

The accompanying notes are an integral part of these consolidated financial statements.

Tesla, Inc.

Consolidated Statements of Comprehensive Income
(in millions)

	Year Ended December 31,		
	2022	2021	2020
Net income	$ 12,587	$ 5,644	$ 862
Other comprehensive (loss) income:			
Foreign currency translation adjustment	(392)	(308)	399
Unrealized net loss on investments	(23)	(1)	—
Comprehensive income	12,172	5,335	1,261
Less: Comprehensive income attributable to noncontrolling interests and redeemable noncontrolling interests in subsidiaries	31	125	141
Comprehensive income attributable to common stockholders	$ 12,141	$ 5,210	$ 1,120

The accompanying notes are an integral part of these consolidated financial statements.

Tesla, Inc.

Consolidated Statements of Redeemable Noncontrolling Interests and Equity
(in millions, except per share data)

	Redeemable Noncontrolling Interests	Common Stock Shares (1)	Common Stock Amount (1)	Additional Paid-In Capital	Accumulated Other Comprehensive (Loss) Income	(Accumulated Deficit) Retained Earnings (1)	Total Stockholders' Equity	Noncontrolling Interests in Subsidiaries	Total Equity
Balance as of December 31, 2019	$ 643	2,716	$ 3	$ 12,736	$ (36)	$ (6,085)	$ 6,618	$ 849	$ 7,467
Adjustments for prior periods from adopting ASU 2016-13	—	—	—	—	—	(37)	(37)	—	(37)
Reclassification between equity and mezzanine equity for convertible senior notes	—	—	—	(51)	—	—	(51)	—	(51)
Exercises of conversion feature of convertible senior notes	—	5	0	59	—	—	59	—	59
Issuance of common stock for equity incentive awards	—	55	0	417	—	—	417	—	417
Issuance of common stock in public offerings, net of issuance costs of $68	—	103	0	12,269	—	—	12,269	—	12,269
Stock-based compensation	—	—	—	1,861	—	—	1,861	—	1,861
Contributions from noncontrolling interests	7	—	—	—	—	—	—	17	17
Distributions to noncontrolling interests	(67)	—	—	—	—	—	—	(132)	(132)
Buy-outs of noncontrolling interests	(4)	—	—	(31)	—	—	(31)	—	(31)
Net income	25	—	—	—	—	721	721	116	837
Other comprehensive income	—	—	—	—	399	—	399	—	399
Balance as of December 31, 2020	$ 604	2,879	$ 3	$ 27,260	$ 363	$ (5,401)	$ 22,225	$ 850	$ 23,075
Adjustments for prior periods from adopting ASU 2020-06	—	—	—	(474)	—	211	(263)	—	(263)
Exercises of conversion feature of convertible senior notes	—	2	0	6	—	—	6	—	6
Settlements of warrants	—	112	0	—	—	—	—	—	—
Issuance of common stock for equity incentive awards	—	107	0	707	—	—	707	—	707
Stock-based compensation	—	—	—	2,299	—	—	2,299	—	2,299
Contributions from noncontrolling interests	2	—	—	—	—	—	—	—	—
Distributions to noncontrolling interests	(66)	—	—	—	—	—	—	(106)	(106)
Buy-outs of noncontrolling interests	(15)	—	—	5	—	—	5	—	5
Net income	43	—	—	—	—	5,519	5,519	82	5,601
Other comprehensive loss	—	—	—	—	(309)	—	(309)	—	(309)
Balance as of December 31, 2021	$ 568	$ 3,100	$ 3	$ 29,803	$ 54	$ 329	$ 30,189	$ 826	$ 31,015
Exercises of conversion feature of convertible senior notes	—	0	0	0	—	—	—	—	—
Settlements of warrants	—	37	0	0	—	—	—	—	—
Issuance of common stock for equity incentive awards	—	27	0	541	—	—	541	—	541
Stock-based compensation	—	—	—	1,806	—	—	1,806	—	1,806
Distributions to noncontrolling interests	(46)	—	—	—	—	—	—	(113)	(113)
Buy-outs of noncontrolling interests	(11)	—	—	27	—	—	27	(61)	(34)
Net (loss) income	(102)	—	—	—	—	12,556	12,556	133	12,689
Other comprehensive loss	—	—	—	—	(415)	—	(415)	—	(415)
Balance as of December 31, 2022	$ 409	3,164	$ 3	$ 32,177	$ (361)	$ 12,885	$ 44,704	$ 785	$ 45,489

(1) Prior period results have been adjusted to reflect the three-for-one stock split effected in the form of a stock dividend in August 2022. See Note 1, *Overview*, for details.

The accompanying notes are an integral part of these consolidated financial statements.

Tesla, Inc.

Consolidated Statements of Cash Flows
(in millions)

	Year Ended December 31,		
	2022	2021	2020
Cash Flows from Operating Activities			
Net income	$ 12,587	$ 5,644	$ 862
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation, amortization and impairment	3,747	2,911	2,322
Stock-based compensation	1,560	2,121	1,734
Inventory and purchase commitments write-downs	177	140	202
Foreign currency transaction net unrealized loss (gain)	81	(55)	114
Non-cash interest and other operating activities	340	245	525
Digital assets loss (gain), net	140	(27)	—
Changes in operating assets and liabilities:			
Accounts receivable	(1,124)	(130)	(652)
Inventory	(6,465)	(1,709)	(422)
Operating lease vehicles	(1,570)	(2,114)	(1,072)
Prepaid expenses and other current assets	(1,417)	(271)	(251)
Other non-current assets	(2,551)	(1,291)	(344)
Accounts payable and accrued liabilities	6,029	4,578	2,102
Deferred revenue	1,131	793	321
Customer deposits	155	186	7
Other long-term liabilities	1,904	476	495
Net cash provided by operating activities	14,724	11,497	5,943
Cash Flows from Investing Activities			
Purchases of property and equipment excluding finance leases, net of sales	(7,158)	(6,482)	(3,157)
Purchases of solar energy systems, net of sales	(5)	(32)	(75)
Purchases of digital assets	—	(1,500)	—
Proceeds from sales of digital assets	936	272	—
Purchase of intangible assets	(9)	—	(10)
Purchases of investments	(5,835)	(132)	—
Proceeds from maturities of investments	22	—	—
Receipt of government grants	76	6	123
Business combinations, net of cash acquired	—	—	(13)
Net cash used in investing activities	(11,973)	(7,868)	(3,132)
Cash Flows from Financing Activities			
Proceeds from issuances of common stock in public offerings, net of issuance costs	—	—	12,269
Proceeds from issuances of debt	—	8,883	9,713
Repayments of convertible and other debt	(3,364)	(14,167)	(11,623)
Collateralized lease repayments	—	(9)	(240)
Proceeds from exercises of stock options and other stock issuances	541	707	417
Principal payments on finance leases	(502)	(439)	(338)
Debt issuance costs	—	(9)	(6)
Proceeds from investments by noncontrolling interests in subsidiaries	—	2	24
Distributions paid to noncontrolling interests in subsidiaries	(157)	(161)	(208)
Payments for buy-outs of noncontrolling interests in subsidiaries	(45)	(10)	(35)
Net cash (used in) provided by financing activities	(3,527)	(5,203)	9,973
Effect of exchange rate changes on cash and cash equivalents and restricted cash	(444)	(183)	334
Net (decrease) increase in cash and cash equivalents and restricted cash	(1,220)	(1,757)	13,118
Cash and cash equivalents and restricted cash, beginning of period	18,144	19,901	6,783
Cash and cash equivalents and restricted cash, end of period	$ 16,924	$ 18,144	$ 19,901
Supplemental Non-Cash Investing and Financing Activities			
Acquisitions of property and equipment included in liabilities	$ 2,148	$ 2,251	$ 1,088
Supplemental Disclosures			
Cash paid during the period for interest, net of amounts capitalized	$ 152	$ 266	$ 444
Cash paid during the period for taxes, net of refunds	$ 1,203	$ 561	$ 115

The accompanying notes are an integral part of these consolidated financial statements.

Note 1 – Overview

Tesla, Inc. (“Tesla”, the “Company”, “we”, “us” or “our”) was incorporated in the State of Delaware on July 1, 2003. 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. Our Chief Executive Officer, as the chief operating decision maker (“CODM”), organizes our company, manages resource allocations and measures performance among two operating and reportable segments: (i) automotive and (ii) energy generation and storage.

Since the first quarter of 2020, there has been a worldwide impact from the COVID-19 pandemic, as well as an easing of restrictions on social, business, travel and government activities and functions. There are ongoing global impacts resulting from the pandemic, and we have been affected by temporary manufacturing closures, employment and compensation adjustments and impediments to administrative activities supporting our product deliveries and deployments. In addition, we have experienced and are experiencing the impacts of varying levels of inflation caused by the COVID-19 pandemic and general global economic conditions.

On August 5, 2022, we increased the number of authorized shares of common stock by 4,000,000,000 shares and our Board of Directors declared the 2022 Stock Split. Each stockholder of record on August 17, 2022 received a dividend of two additional shares of common stock for each then-held share, distributed after close of trading on August 24, 2022. All share and per share amounts presented herein have been retroactively adjusted to reflect the impact of the 2022 Stock Split.

Note 2 – Summary of Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements have been prepared in conformity with GAAP and reflect our accounts and operations and those of our subsidiaries in which we have a controlling financial interest. In accordance with the provisions of ASC 810, *Consolidation* (“ASC 810”), we consolidate any variable interest entity (“VIE”) of which we are the primary beneficiary. We have formed VIEs with financing fund investors in the ordinary course of business in order to facilitate the funding and monetization of certain attributes associated with solar energy systems and leases under our direct vehicle leasing programs. The typical condition for a controlling financial interest ownership is holding a majority of the voting interests of an entity; however, a controlling financial interest may also exist in entities, such as VIEs, through arrangements that do not involve controlling voting interests. ASC 810 requires a variable interest holder to consolidate a VIE if that party has the power to direct the activities of the VIE that most significantly impact the VIE’s economic performance and the obligation to absorb losses of the VIE that could potentially be significant to the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE. We do not consolidate a VIE in which we have a majority ownership interest when we are not considered the primary beneficiary. We have determined that we are the primary beneficiary of all the VIEs (see Note 16*, Variable Interest Entity Arrangements*). We evaluate our relationships with all the VIEs on an ongoing basis to ensure that we continue to be the primary beneficiary. All intercompany transactions and balances have been eliminated upon consolidation.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues, costs and expenses and related disclosures in the accompanying notes. The estimates used for, but not limited to, determining significant economic incentive for resale value guarantee arrangements, sales return reserves, the collectability of accounts and finance receivables, inventory valuation, warranties, fair value of long-lived assets, goodwill, fair value of financial instruments, fair value and residual value of operating lease vehicles and solar energy systems subject to leases could be impacted. We have assessed the impact and are not aware of any specific events or circumstances that required an update to our estimates and assumptions or materially affected the carrying value of our assets or liabilities as of the date of issuance of this Annual Report on Form 10-K. These estimates may change as new events occur and additional information is obtained. Actual results could differ materially from these estimates under different assumptions or conditions.

Reclassifications

Certain prior period balances have been reclassified to conform to the current period presentation in the consolidated financial statements and the accompanying notes.

Revenue Recognition

Revenue by source

The following table disaggregates our revenue by major source (in millions):

	Year Ended December 31,		
	2022	2021	2020
Automotive sales (1)	$ 67,210	$ 44,125	$ 24,604
Automotive regulatory credits	1,776	1,465	1,580
Energy generation and storage sales	3,376	2,279	1,477
Services and other	6,091	3,802	2,306
Total revenues from sales and services	78,453	51,671	29,967
Automotive leasing	2,476	1,642	1,052
Energy generation and storage leasing	533	510	517
Total revenues	$ 81,462	$ 53,823	$ 31,536

(1) Pricing adjustments on our vehicle offerings can impact the estimate of likelihood that customers would exercise their resale value guarantees, resulting in an adjustment of our sales return reserve on vehicles sold with resale value guarantees. Actual return rates being lower than expected and increases in resale values of our vehicles in 2021 resulted in a net release of our reserve of $365 million for the year ended December 31, 2021, which represented increases in automotive sales revenue. The net release or increase of reserves which impacted automotive sales revenue were immaterial for the years ended December 31, 2022 and December 31, 2020. Further, $324 million of the total revenue recognized as of December 31, 2022 is related to the general FSD feature release in North America in the fourth quarter of 2022.

Automotive Segment

Automotive Sales

Automotive sales revenue includes revenues related to cash and financing deliveries of new vehicles, and specific other features and services that meet the definition of a performance obligation under ASC 606, including access to our FSD features, internet connectivity, Supercharger network and over-the-air software updates. We recognize revenue on automotive sales upon delivery to the customer, which is when the control of a vehicle transfers. Payments are typically received at the point control transfers or in accordance with payment terms customary to the business, except sales we finance for which payments are collected over the contractual loan term. We also recognize a sales return reserve based on historical experience plus consideration for expected future market values, when we offer resale value guarantees or similar buyback terms. Other features and services such as access to our internet connectivity, legacy programs offering unlimited free Supercharging and over-the-air software updates are provisioned upon control transfer of a vehicle and recognized over time on a straight-line basis as we have a stand-ready obligation to deliver such services to the customer. Other limited free Supercharging incentives are recognized based on actual usage or expiration, whichever is earlier. We recognize revenue related to these other features and services over the performance period, which is generally the expected ownership life of the vehicle. Revenue related to FSD is recognized when functionality is delivered to the customer and the portion related to software updates is recognized over time. For our obligations related to automotive sales, we estimate standalone selling price by considering costs used to develop and deliver the service, third-party pricing of similar options and other information that may be available.

Any fees that are paid or payable by us to a customer’s lender when we arrange the financing are recognized as an offset against automotive sales revenue. Costs to obtain a contract mainly relate to commissions paid to our sales personnel for the sale of vehicles. As our contract costs related to automotive sales are typically fulfilled within one year, the costs to obtain a contract are expensed as incurred. Amounts billed to customers related to shipping and handling are classified as automotive sales revenue, and we have elected to recognize the cost for freight and shipping when control over vehicles, parts or accessories have transferred to the customer as an expense in cost of automotive sales revenue. Our policy is to exclude taxes collected from a customer from the transaction price of automotive contracts.

We offer resale value guarantees or similar buy-back terms to certain international customers who purchase vehicles and who finance their vehicles through one of our specified commercial banking partners. Under these programs, we receive full payment for the vehicle sales price at the time of delivery and our counterparty has the option of selling their vehicle back to us during the guarantee period, which currently is generally at the end of the term of the applicable loan or financing program, for a pre-determined resale value. We account for such automotive sales as a sale with a right of return when we do not believe the customer has a significant economic incentive to exercise the resale value guarantee provided to them at contract inception. The process to determine whether there is a significant economic incentive includes a comparison of a vehicle's estimated market value at the time the option is exercisable with the guaranteed resale value to determine the customer's economic incentive to exercise. On a quarterly basis, we assess the estimated market values of vehicles sold with resale value guarantees to determine whether there have been changes to the likelihood of future product returns. As we accumulate more data related to the resale values of our vehicles or as market conditions change, there may be material changes to their estimated values. The total sales return reserve on vehicles sold with resale value guarantees was $91 million and $223 million as of December 31, 2022 and 2021, respectively, of which $40 million and $91 million was short-term, respectively.

Deferred revenue related to the access to our FSD features, internet connectivity, free Supercharging programs and over-the-air software updates primarily on automotive sales consisted of the following (in millions):

	Year ended December 31,	
	2022	**2021**
Deferred revenue— beginning of period	$ 2,382	$ 1,926
Additions	1,178	847
Net changes in liability for pre-existing contracts	(67)	(25)
Revenue recognized	(580)	(366)
Deferred revenue— end of period	$ 2,913	$ 2,382

Deferred revenue is equivalent to the total transaction price allocated to the performance obligations that are unsatisfied, or partially unsatisfied, as of the balance sheet date. Revenue recognized from the deferred revenue balance as of December 31, 2021 was $472 million as of December 31, 2022, primarily related to the general FSD feature release in North America in the fourth quarter of 2022. We had recognized revenue of $312 million from the deferred revenue balance as of December 31, 2020, for the year ended December 31, 2021. Of the total deferred revenue balance as of December 31, 2022, we expect to recognize $639 million of revenue in the next 12 months. The remaining balance will be recognized at the time of transfer of control of the product or over the performance period as discussed above in Automotive Sales.

We have been providing loans for financing our automotive deliveries during the year ended December 31, 2022. We have recorded net financing receivables on the consolidated balance sheets, of which $128 million is recorded within Accounts receivable, net, for the current portion and $665 million is recorded within Other non-current assets for the long-term portion, as of December 31, 2022.

Automotive Regulatory Credits

We earn tradable credits in the operation of our automotive business under various regulations related to 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.

Payments for automotive regulatory credits are typically received at the point control transfers to the customer, or in accordance with payment terms customary to the business. We recognize revenue on the sale of automotive regulatory credits, which have negligible incremental costs associated with them, at the time control of the regulatory credits is transferred to the purchasing party. Deferred revenue related to sales of automotive regulatory credits was immaterial as of December 31, 2022 and 2021. Revenue recognized from the deferred revenue balance as of December 31, 2021 and 2020 was immaterial for the years ended December 31, 2022 and 2021. During the year ended December 31, 2022, we had also recognized $288 million in revenue due to changes in regulation which entitled us to additional consideration for credits sold previously.

Automotive Leasing Revenue

Direct Vehicle Operating Leasing Program

We have outstanding leases under our direct vehicle operating leasing programs in the U.S., Canada and in certain countries in Europe. Qualifying customers are permitted to lease a vehicle directly from Tesla for up to 48 months. At the end of the lease term, customers are generally required to return the vehicles to us. We account for these leasing transactions as operating leases. We record leasing revenues to automotive leasing revenue on a straight-line basis over the contractual term, and we record the depreciation of these vehicles to cost of automotive leasing revenue. For the years ended December 31, 2022, 2021 and 2020, we recognized $1.75 billion, $1.25 billion and $752 million of direct vehicle leasing revenue, respectively. As of December 31, 2022 and 2021, we had deferred $407 million and $392 million, respectively, of lease-related upfront payments, which will be recognized on a straight-line basis over the contractual terms of the individual leases.

Our policy is to exclude taxes collected from a customer from the transaction price of automotive contracts.

Direct Sales-Type Leasing Program

We have outstanding direct leases and vehicles financed by us under loan arrangements accounted for as sales-type leases under ASC 842, *Leases* ("ASC 842"), in certain countries in Asia and Europe. Depending on the specific program, customers may or may not have a right to return the vehicle to us during or at the end of the lease term. If the customer does not have a right to return, the customer will take title to the vehicle at the end of the lease term after making all contractual payments. Under the programs for which there is a right to return, the purchase option is reasonably certain to be exercised by the lessee and we therefore expect the customer to take title to the vehicle at the end of the lease term after making all contractual payments. Our arrangements under these programs can have terms for up to 72 months. We recognize all revenue and costs associated with the sales-type lease as automotive leasing revenue and automotive leasing cost of revenue, respectively, upon delivery of the vehicle to the customer. Interest income based on the implicit rate in the lease is recorded to automotive leasing revenue over time as customers are invoiced on a monthly basis. For the years ended December 31, 2022, 2021 and 2020, we recognized $683 million, $369 million and $120 million, respectively, of sales-type leasing revenue and $427 million, $234 million and $87 million, respectively, of sales-type leasing cost of revenue.

Services and Other Revenue

Services and other revenue consists of non-warranty after-sales vehicle services and parts, sales of used vehicles, paid Supercharging, retail merchandise and vehicle insurance revenue.

Revenues related to repair and maintenance services are recognized over time as services are provided and extended service plans are recognized over the performance period of the service contract as the obligation represents a stand-ready obligation to the customer. We sell used vehicles, services, service plans, vehicle components and merchandise separately and thus use standalone selling prices as the basis for revenue allocation to the extent that these items are sold in transactions with other performance obligations. Payment for used vehicles, services, and merchandise are typically received at the point when control transfers to the customer or in accordance with payment terms customary to the business. Payments received for prepaid plans are refundable upon customer cancellation of the related contracts and are included within Customer deposits on the consolidated balance sheets. Deferred revenue related to services and other revenue was immaterial as of December 31, 2022 and 2021.

Energy Generation and Storage Segment

Energy Generation and Storage Sales

Energy generation and storage sales revenue consists of the sale of solar energy systems and energy storage systems to residential, small commercial, large commercial and utility grade customers. Sales of solar energy systems to residential and small scale commercial customers consist of the engineering, design and installation of the system. Residential and small scale commercial customers pay the full purchase price of the solar energy system upfront. Revenue for the design and installation obligation is recognized when control transfers, which is when we install a solar energy system and the system passes inspection by the utility or the authority having jurisdiction. Sales of energy storage systems to residential and small scale commercial customers consist of the installation of the energy storage system and revenue is recognized when control transfers, which is when the product has been delivered or, if we are performing installation, when installed and commissioned. Payment for such storage systems is made upon invoice or in accordance with payment terms customary to the business.

For large commercial and utility grade solar energy system and energy storage system sales which consist of the engineering, design and installation of the system, customers make milestone payments that are consistent with contract-specific phases of a project. Revenue from such contracts is recognized over time using the percentage of completion method based on cost incurred as a percentage of total estimated contract costs for energy storage system sales and as a percentage of total estimated labor hours for solar energy system sales.

In instances where there are multiple performance obligations in a single contract, we allocate the consideration to the various obligations in the contract based on the relative standalone selling price method. Standalone selling prices are estimated based on estimated costs plus margin or by using market data for comparable products. Costs incurred on the sale of residential installations before the solar energy systems are completed are included as work in process within inventory in the consolidated balance sheets. Any fees that are paid or payable by us to a solar loan lender would be recognized as an offset against revenue. Costs to obtain a contract relate mainly to commissions paid to our sales personnel related to the sale of solar energy systems and energy storage systems. As our contract costs related to solar energy system and energy storage system sales are typically fulfilled within one year, the costs to obtain a contract are expensed as incurred.

As part of our solar energy system and energy storage system contracts, we may provide the customer with performance guarantees that warrant that the underlying system will meet or exceed the minimum energy generation or energy performance requirements specified in the contract. In certain instances, we may receive a bonus payment if the system performs above a specified level. Conversely, if a solar energy system or energy storage system does not meet the performance guarantee requirements, we may be required to pay liquidated damages. Other forms of variable consideration related to our large commercial and utility grade solar energy system and energy storage system contracts include variable customer payments that will be made based on our energy market participation activities. Such guarantees and variable customer payments represent a form of variable consideration and are estimated at contract inception at their most likely amount and updated at the end of each reporting period as additional performance data becomes available. Such estimates are included in the transaction price only to the extent that it is probable a significant reversal of revenue will not occur.

We record as deferred revenue any non-refundable amounts that are collected from customers related to fees charged for prepayments, which is recognized as revenue ratably over the respective customer contract term. As of December 31, 2022 and 2021, deferred revenue related to such customer payments amounted to $863 million and $399 million, respectively, mainly due to milestone payments. Revenue recognized from the deferred revenue balance as of December 31, 2021 and 2020 was $171 million and $93 million for the years ended December 31, 2022 and 2021, respectively. We have elected the practical expedient to omit disclosure of the amount of the transaction price allocated to remaining performance obligations for energy generation and storage sales with an original expected contract length of one year or less and the amount that we have the right to invoice when that amount corresponds directly with the value of the performance to date. As of December 31, 2022, total transaction price allocated to performance obligations that were unsatisfied or partially unsatisfied for contracts with an original expected length of more than one year was $210 million. Of this amount, we expect to recognize $12 million in the next 12 months and the remaining over a period up to 25 years.

We have been providing loans for financing our energy generation products during the year ended December 31, 2022. We have recorded net financing receivables on the consolidated balance sheets, of which $24 million is recorded within Accounts receivable, net, for the current portion and $387 million is recorded within Other non-current assets for the long-term portion, as of December 31, 2022.

Energy Generation and Storage Leasing

For revenue arrangements where we are the lessor under operating lease agreements for energy generation and storage products, we record lease revenue from minimum lease payments, including upfront rebates and incentives earned from such systems, on a straight-line basis over the life of the lease term, assuming all other revenue recognition criteria have been met. The difference between the payments received and the revenue recognized is recorded as deferred revenue or deferred asset on the consolidated balance sheet.

For solar energy systems where customers purchase electricity from us under PPAs prior to January 1, 2019, we have determined that these agreements should be accounted for as operating leases pursuant to ASC 840, *Leases*. Revenue is recognized based on the amount of electricity delivered at rates specified under the contracts, assuming all other revenue recognition criteria are met.

We record as deferred revenue any amounts that are collected from customers, including lease prepayments, in excess of revenue recognized, which is recognized as revenue ratably over the respective customer contract term. As of December 31, 2022 and 2021, deferred revenue related to such customer payments amounted to $191 million and $198 million, respectively. Deferred revenue also includes the portion of rebates and incentives received from utility companies and various local and state government agencies, which is recognized as revenue over the lease term. As of December 31, 2022 and 2021, deferred revenue from rebates and incentives amounted to $25 million and $27 million, respectively.

We capitalize initial direct costs from the execution of agreements for solar energy systems and PPAs, which include the referral fees and sales commissions, as an element of solar energy systems, net, and subsequently amortize these costs over the term of the related agreements.

Cost of Revenues

Automotive Segment

Automotive Sales

Cost of automotive sales revenue includes direct and indirect materials, labor costs, manufacturing overhead, including depreciation costs of tooling and machinery, shipping and logistic costs, vehicle connectivity costs, allocations of electricity and infrastructure costs related to our Supercharger network and reserves for estimated warranty expenses. Cost of automotive sales revenues also includes adjustments to warranty expense and charges to write down the carrying value of our inventory when it exceeds its estimated net realizable value and to provide for obsolete and on-hand inventory in excess of forecasted demand.

Automotive Leasing

Cost of automotive leasing revenue includes the depreciation of operating lease vehicles, cost of goods sold associated with direct sales-type leases and warranty expense related to leased vehicles. Cost of automotive leasing revenue also includes vehicle connectivity costs and allocations of electricity and infrastructure costs related to our Supercharger network for vehicles under our leasing programs.

Services and Other

Costs of services and other revenue includes costs associated with providing non-warranty after-sales services and parts, costs of paid Supercharging, cost of used vehicles including refurbishment costs, costs for retail merchandise, and costs to provide vehicle insurance.

Energy Generation and Storage Segment

Energy Generation and Storage

Cost of energy generation and storage revenue includes direct and indirect material and labor costs, warehouse rent, freight, warranty expense, other overhead costs and amortization of certain acquired intangible assets. Cost of energy generation and storage revenue also includes charges to write down the carrying value of our inventory when it exceeds its estimated net realizable value and to provide for obsolete and on-hand inventory in excess of forecasted demand. In agreements for solar energy systems and PPAs where we are the lessor, the cost of revenue is primarily comprised of depreciation of the cost of leased solar energy systems, maintenance costs associated with those systems and amortization of any initial direct costs.

Research and Development Costs

Research and development costs are expensed as incurred.

Income Taxes

Income taxes are computed using the asset and liability method, under which deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to affect taxable income. Valuation allowances are established when necessary to reduce deferred tax assets to the amount expected to be realized.

We record liabilities related to uncertain tax positions when, despite our belief that our tax return positions are supportable, we believe that it is more likely than not that those positions may not be fully sustained upon review by tax authorities. Accrued interest and penalties related to unrecognized tax benefits are classified as income tax expense.

The Tax Cuts and Jobs Act (“TCJA”) subjects a U.S. shareholder to tax on global intangible low-taxed income (“GILTI”) earned by certain foreign subsidiaries. Under GAAP, we can make an accounting policy election to either treat taxes due on the GILTI inclusion as a current period expense or factor such amounts into our measurement of deferred taxes. We elected the deferred method, under which we recorded the corresponding deferred tax assets and liabilities in our consolidated balance sheets, currently subject to valuation allowance.

Comprehensive Income

Comprehensive income is comprised of net income and other comprehensive (loss) income. Other comprehensive (loss) income consists of foreign currency translation adjustments and unrealized net gains and losses on investments that have been excluded from the determination of net income.

Stock-Based Compensation

We use the fair value method of accounting for our stock options and RSUs granted to employees and for our ESPP to measure the cost of employee services received in exchange for the stock-based awards. The fair value of stock option awards with only service and/or performance conditions is estimated on the grant or offering date using the Black-Scholes option-pricing model. The Black-Scholes option-pricing model requires inputs such as the risk-free interest rate, expected term and expected volatility. These inputs are subjective and generally require significant judgment. The fair value of RSUs is measured on the grant date based on the closing fair market value of our common stock. The resulting cost is recognized over the period during which an employee is required to provide service in exchange for the awards, usually the vesting period, which is generally four years for stock options and RSUs and six months for the ESPP. Stock-based compensation expense is recognized on a straight-line basis, net of actual forfeitures in the period.

For performance-based awards, stock-based compensation expense is recognized over the expected performance achievement period of individual performance milestones when the achievement of each individual performance milestone becomes probable.

As we accumulate additional employee stock-based awards data over time and as we incorporate market data related to our common stock, we may calculate significantly different volatilities and expected lives, which could materially impact the valuation of our stock-based awards and the stock-based compensation expense that we will recognize in future periods. Stock-based compensation expense is recorded in Cost of revenues, Research and development expense and Selling, general and administrative expense in the consolidated statements of operations.

Noncontrolling Interests and Redeemable Noncontrolling Interests

Noncontrolling interests and redeemable noncontrolling interests represent third-party interests in the net assets under certain funding arrangements, or funds, that we have entered into to finance the costs of solar energy systems and vehicles under operating leases. We have determined that the contractual provisions of the funds represent substantive profit-sharing arrangements. We have further determined that the methodology for calculating the noncontrolling interest and redeemable noncontrolling interest balances that reflects the substantive profit-sharing arrangements is a balance sheet approach using the hypothetical liquidation at book value (“HLBV”) method. We, therefore, determine the amount of the noncontrolling interests and redeemable noncontrolling interests in the net assets of the funds at each balance sheet date using the HLBV method, which is presented on the consolidated balance sheet as noncontrolling interests in subsidiaries and redeemable noncontrolling interests in subsidiaries. Under the HLBV method, the amounts reported as noncontrolling interests and redeemable noncontrolling interests in the consolidated balance sheet represent the amounts the third parties would hypothetically receive at each balance sheet date under the liquidation provisions of the funds, assuming the net assets of the funds were liquidated at their recorded amounts determined in accordance with GAAP and with tax laws effective at the balance sheet date and distributed to the third parties. The third parties’ interests in the results of operations of the funds are determined as the difference in the noncontrolling interest and redeemable noncontrolling interest balances in the consolidated balance sheets between the start and end of each reporting period, after taking into account any capital transactions between the funds and the third parties. However, the redeemable noncontrolling interest balance is at least equal to the redemption amount. The redeemable noncontrolling interest balance is presented as temporary equity in the mezzanine section of the consolidated balance sheet since these third parties have the right to redeem their interests in the funds for cash or other assets. For certain funds, there may be significant fluctuations in net income attributable to noncontrolling interests and redeemable noncontrolling interests in subsidiaries due to changes in the liquidation provisions as time-based milestones are reached.

Net Income per Share of Common Stock Attributable to Common Stockholders

Basic net income per share of common stock attributable to common stockholders is calculated by dividing net income attributable to common stockholders by the weighted-average shares of common stock outstanding for the period. Potentially dilutive shares, which are based on the weighted-average shares of common stock underlying outstanding stock-based awards, warrants and convertible senior notes using the treasury stock method or the if-converted method, as applicable, are included when calculating diluted net income per share of common stock attributable to common stockholders when their effect is dilutive.

Furthermore, in connection with the offerings of our convertible senior notes, we entered into convertible note hedges and warrants (see Note 11, *Debt*). However, our convertible note hedges are not included when calculating potentially dilutive shares since their effect is always anti-dilutive. The strike price on the warrants were below our average share price during the period and were included in the tables below. Warrants are included in the weighted-average shares used in computing basic net income per share of common stock in the period(s) they are settled.

The following table presents the reconciliation of net income attributable to common stockholders to net income used in computing basic and diluted net income per share of common stock (in millions):

	Year Ended December 31,		
	2022	2021	2020
Net income attributable to common stockholders	$ 12,556	$ 5,519	$ 721
Less: Buy-out of noncontrolling interest	(27)	(5)	31
Net income used in computing basic net income per share of common stock	12,583	5,524	690
Less: Dilutive convertible debt	(1)	(9)	—
Net income used in computing diluted net income per share of common stock	$ 12,584	$ 5,533	$ 690

The following table presents the reconciliation of basic to diluted weighted average shares used in computing net income per share of common stock attributable to common stockholders, as adjusted to give effect to the 2022 Stock Split (in millions):

	Year Ended December 31,		
	2022	2021	2020
Weighted average shares used in computing net income per share of common stock, basic	3,130	2,959	2,798
Add:			
Stock-based awards	310	292	198
Convertible senior notes	3	29	141
Warrants	32	106	112
Weighted average shares used in computing net income per share of common stock, diluted	3,475	3,386	3,249

The following table presents the potentially dilutive shares that were excluded from the computation of diluted net income per share of common stock attributable to common stockholders, because their effect was anti-dilutive, as adjusted to give effect to the 2022 Stock Split (in millions):

	Year Ended December 31,		
	2022	2021	2020
Stock-based awards	4	1	6
Convertible senior notes (1)	—	—	3

(1) Under the modified retrospective method of adoption of ASU 2020-06, the dilutive impact of convertible senior notes was calculated using the if-converted method for the years ended December 31, 2022 and 2021. Certain convertible senior notes were calculated using the treasury stock method for the year ended December 31, 2020.

Business Combinations

We account for business acquisitions under ASC 805, *Business Combinations*. The total purchase consideration for an acquisition is measured as the fair value of the assets given, equity instruments issued and liabilities assumed at the acquisition date. Costs that are directly attributable to the acquisition are expensed as incurred. Identifiable assets (including intangible assets), liabilities assumed (including contingent liabilities) and noncontrolling interests in an acquisition are measured initially at their fair values at the acquisition date. We recognize goodwill if the fair value of the total purchase consideration and any noncontrolling interests is in excess of the net fair value of the identifiable assets acquired and the liabilities assumed. We recognize a bargain purchase gain within Other (expense) income, net, in the consolidated statement of operations if the net fair value of the identifiable assets acquired and the liabilities assumed is in excess of the fair value of the total purchase consideration and any noncontrolling interests. We include the results of operations of the acquired business in the consolidated financial statements beginning on the acquisition date.

Cash and Cash Equivalents

All highly liquid investments with an original maturity of three months or less at the date of purchase are considered cash equivalents. Our cash equivalents are primarily comprised of money market funds and certificates of deposit.

Restricted Cash

We maintain certain cash balances restricted as to withdrawal or use. Our restricted cash is comprised primarily of cash held to service certain payments under various secured debt facilities. In addition, restricted cash includes cash held as collateral for certain permits as well as sales to lease partners with a resale value guarantee, letters of credit, real estate leases, deposits held for our insurance services and certain operating leases. We record restricted cash as other assets in the consolidated balance sheets and determine current or non-current classification based on the expected duration of the restriction.

Our total cash and cash equivalents and restricted cash, as presented in the consolidated statements of cash flows, was as follows (in millions):

	December 31, 2022	December 31, 2021	December 31, 2020
Cash and cash equivalents	$ 16,253	$ 17,576	$ 19,384
Restricted cash included in prepaid expenses and other current assets	294	345	238
Restricted cash included in other non-current assets	377	223	279
Total as presented in the consolidated statements of cash flows	$ 16,924	$ 18,144	$ 19,901

Investments

Investments may be comprised of a combination of marketable securities, including U.S. government securities, corporate debt securities, time deposit, and certain certificates of deposit, which are all designated as available-for-sale and reported at estimated fair value, with unrealized gains and losses recorded in accumulated other comprehensive income which is included within stockholders' equity. Available-for-sale marketable securities with maturities greater than three months at the date of purchase are included in short-term investments in our consolidated balance sheets. Interest, dividends, amortization and accretion of purchase premiums and discounts on these investments are included within Interest income in our consolidated statements of operations.

The cost of available-for-sale investments sold is based on the specific identification method. Realized gains and losses on the sale of available-for-sale investments are recorded in Other (expense) income, net.

We regularly review all of our investments for declines in fair value. The review includes but is not limited to (i) the consideration of the cause of the decline, (ii) any currently recorded expected credit losses and (iii) the creditworthiness of the respective security issuers. The amortized cost basis of our investments approximates its fair value.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable primarily include amounts related to receivables from financial institutions and leasing companies offering various financing products to our customers, sales of energy generation and storage products, sales of regulatory credits to other automotive manufacturers and government rebates already passed through to customers. We provide an allowance against accounts receivable for the amount we expect to be uncollectible. We write-off accounts receivable against the allowance when they are deemed uncollectible.

Depending on the day of the week on which the end of a fiscal quarter falls, our accounts receivable balance may fluctuate as we are waiting for certain customer payments to clear through our banking institutions and receipts of payments from our financing partners, which can take up to approximately two weeks based on the contractual payment terms with such partners. Our accounts receivable balances associated with our sales of regulatory credits, which are typically transferred to other manufacturers during the last few days of the quarter, is dependent on contractual payment terms. Additionally, government rebates can take up to a year or more to be collected depending on the customary processing timelines of the specific jurisdictions issuing them. These various factors may have a significant impact on our accounts receivable balance from period to period. As of December 31, 2022 and December 31, 2021, we had $753 million and $627 million, respectively, of long-term government rebates receivable in Other non-current assets in our consolidated balance sheets.

Financing Receivables

We provide financing options to our customers for our automotive and energy products. Financing receivables are carried at amortized cost, net of allowance for loan losses. Provisions for loan losses are charged to operations in amounts sufficient to maintain the allowance for loan losses at levels considered adequate to cover expected credit losses on the financing receivables. In determining expected credit losses, we consider our historical level of credit losses, current economic trends, and reasonable and supportable forecasts that affect the collectability of the future cash flows.

When originating consumer receivables, we review the credit application, the proposed contract terms, credit bureau information (e.g., FICO score) and other information. Our evaluation emphasizes the applicant's ability to pay and creditworthiness focusing on payment, affordability, and applicant credit history as key considerations. Generally, all customers in this portfolio have strong creditworthiness at loan origination.

After origination, we review the credit quality of retail financing based on customer payment activity and aging analysis. For all financing receivables, we define "past due" as any payment, including principal and interest, which is at least 31 days past the contractual due date. As of December 31, 2022, the majority of our financing receivables were at current status with only an immaterial balance being past due. Additionally, as of December 31, 2022, the majority of our financing receivables, excluding MyPower notes receivable, were originated in 2022.

We have customer notes receivable under the legacy MyPower loan program, which provided residential customers with the option to finance the purchase of a solar energy system through a 30-year loan and were all originated prior to year 2018. The outstanding balances, net of any allowance for expected credit losses, are presented on the consolidated balance sheets as a component of Prepaid expenses and other current assets for the current portion and as Other non-current assets for the long-term portion. As of December 31, 2022 and 2021, the total outstanding balance of MyPower customer notes receivable, net of allowance for expected credit losses, was $280 million and $299 million, respectively, of which $7 million and $11 million were due in the next 12 months as of December 31, 2022 and 2021, respectively. As of December 31, 2022 and 2021, the allowance for expected credit losses was $37 million and $41 million, respectively.

Concentration of Risk

Credit Risk

Financial instruments that potentially subject us to a concentration of credit risk consist of cash, cash equivalents, investments, restricted cash, accounts receivable and other finance receivables. Our cash and investments balances are primarily on deposit at high credit quality financial institutions or invested in money market funds. These deposits are typically in excess of insured limits. As of December 31, 2022 and December 31, 2021, no entity represented 10% or more of our total receivables balance.

Supply Risk

We are dependent on our suppliers, including single source suppliers, and the inability of these suppliers to deliver necessary components of our products in a timely manner at prices, quality levels and volumes acceptable to us, or our inability to efficiently manage these components from these suppliers, could have a material adverse effect on our business, prospects, financial condition and operating results.

Inventory Valuation

Inventories are stated at the lower of cost or net realizable value. Cost is computed using standard cost for vehicles and energy products, which approximates actual cost on a first-in, first-out basis. We record inventory write-downs for excess or obsolete inventories based upon assumptions about current and future demand forecasts. If our inventory on-hand is in excess of our future demand forecast, the excess amounts are written-off.

We also review our inventory to determine whether its carrying value exceeds the net amount realizable upon the ultimate sale of the inventory. This requires us to determine the estimated selling price of our vehicles less the estimated cost to convert the inventory on-hand into a finished product. Once inventory is written-down, a new, lower cost basis for that inventory is established and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis.

Should our estimates of future selling prices or production costs change, additional and potentially material write-downs may be required. A small change in our estimates may result in a material charge to our reported financial results.

Operating Lease Vehicles

Vehicles that are leased as part of our direct vehicle leasing program are classified as operating lease vehicles at cost less accumulated depreciation. We generally depreciate their cost, less residual value, using the straight-line-method to cost of automotive leasing revenue over the contractual period. The gross cost of operating lease vehicles as of December 31, 2022 and December 31, 2021 was $6.08 billion and $5.28 billion, respectively. Operating lease vehicles on the consolidated balance sheets are presented net of accumulated depreciation of $1.04 billion and $773 million as of December 31, 2022 and December 31, 2021, respectively.

Digital Assets, Net

We currently account for all digital assets held as indefinite-lived intangible assets in accordance with ASC 350, *Intangibles—Goodwill and Other*. We have ownership of and control over our digital assets and we may use third-party custodial services to secure it. The digital assets are initially recorded at cost and are subsequently remeasured on the consolidated balance sheet at cost, net of any impairment losses incurred since acquisition.

We determine the fair value of our digital assets on a nonrecurring basis in accordance with ASC 820, *Fair Value Measurement* ("ASC 820"), based on quoted prices on the active exchange(s) that we have determined is the principal market for such assets (Level I inputs). We perform an analysis each quarter to identify whether events or changes in circumstances, principally decreases in the quoted prices on active exchanges, indicate that it is more likely than not that our digital assets are impaired. In determining if an impairment has occurred, we consider the lowest market price of one unit of digital asset quoted on the active exchange since acquiring the digital asset. When the then current carrying value of a digital asset exceeds the fair value determined each quarter, an impairment loss has occurred with respect to those digital assets in the amount equal to the difference between their carrying values and the prices determined.

Impairment losses are recognized within Restructuring and other in the consolidated statements of operations in the period in which the impairment is identified. Gains are not recorded until realized upon sale(s), at which point they are presented net of any impairment losses for the same digital assets held within Restructuring and other. In determining the gain to be recognized upon sale, we calculate the difference between the sales price and carrying value of the digital assets sold immediately prior to sale.

See Note 3, *Digital Assets, Net*, for further information regarding digital assets.

Solar Energy Systems, Net

We are the lessor of solar energy systems. Solar energy systems are stated at cost less accumulated depreciation.

Depreciation and amortization is calculated using the straight-line method over the estimated useful lives of the respective assets, as follows:

Solar energy systems in service	30 to 35 years
Initial direct costs related to customer solar energy system lease acquisition costs	Lease term (up to 25 years)

Solar energy systems pending interconnection will be depreciated as solar energy systems in service when they have been interconnected and placed in-service. Solar energy systems under construction represents systems that are under installation, which will be depreciated as solar energy systems in service when they are completed, interconnected and placed in service. Initial direct costs related to customer solar energy system agreement acquisition costs are capitalized and amortized over the term of the related customer agreements.

Property, Plant and Equipment, Net

Property, plant and equipment, net, including leasehold improvements, are recognized at cost less accumulated depreciation. Depreciation is generally computed using the straight-line method over the estimated useful lives of the respective assets, as follows:

Machinery, equipment, vehicles and office furniture	3 to 15 years
Tooling	4 to 7 years
Building and building improvements	15 to 30 years
Computer equipment and software	3 to 10 years

Leasehold improvements are depreciated on a straight-line basis over the shorter of their estimated useful lives or the terms of the related leases.

Upon the retirement or sale of our property, plant and equipment, the cost and associated accumulated depreciation are removed from the consolidated balance sheet, and the resulting gain or loss is reflected on the consolidated statement of operations. Maintenance and repair expenditures are expensed as incurred while major improvements that increase the functionality, output or expected life of an asset are capitalized and depreciated ratably over the identified useful life.

Interest expense on outstanding debt is capitalized during the period of significant capital asset construction. Capitalized interest on construction in progress is included within Property, plant and equipment, net and is amortized over the life of the related assets.

Long-Lived Assets Including Acquired Intangible Assets

We review our property, plant and equipment, solar energy systems, long-term prepayments and intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset (or asset group) may not be recoverable. We measure recoverability by comparing the carrying amount to the future undiscounted cash flows that the asset is expected to generate. If the asset is not recoverable, its carrying amount would be adjusted down to its fair value. For the years ended December 31, 2022, 2021 and 2020, we have recognized no material impairments of our long-lived assets.

Intangible assets with definite lives are amortized on a straight-line basis over their estimated useful lives, which range from three to thirty years.

Goodwill

We assess goodwill for impairment annually in the fourth quarter, or more frequently if events or changes in circumstances indicate that it might be impaired, by comparing its carrying value to the reporting unit’s fair value. For the years ended December 31, 2022, 2021, and 2020, we did not recognize any impairment of goodwill.

Capitalization of Software Costs

We capitalize costs incurred in the development of internal use software, during the application development stage to Property, plant and equipment, net on the consolidated balance sheets. Costs related to preliminary project activities and post-implementation activities are expensed as incurred. Such costs are amortized on a straight-line basis over its estimated useful life of three years.

Software development costs incurred in development of software to be sold, leased, or otherwise marketed, incurred subsequent to the establishment of technological feasibility and prior to the general availability of the software are capitalized when they are expected to become significant. Such costs are amortized over the estimated useful life of the applicable software once it is made generally available to our customers.

We evaluate the useful lives of these assets on an annual basis, and we test for impairment whenever events or changes in circumstances occur that could impact the recoverability of these assets. For the years ended December 31, 2022, 2021, and 2020, we have recognized no impairments of capitalized software costs.

Foreign Currency

We determine the functional and reporting currency of each of our international subsidiaries and their operating divisions based on the primary currency in which they operate. In cases where the functional currency is not the U.S. dollar, we recognize a cumulative translation adjustment created by the different rates we apply to current period income or loss and the balance sheet. For each subsidiary, we apply the monthly average functional exchange rate to its monthly income or loss and the month-end functional currency rate to translate the balance sheet.

Foreign currency transaction gains and losses are a result of the effect of exchange rate changes on transactions denominated in currencies other than the functional currency. Transaction gains and losses are recognized in Other (expense) income, net, in the consolidated statements of operations. For the years ended December 31, 2022, 2021 and 2020, we recorded a net foreign currency transaction loss of $89 million, gain of $97 million and loss of $114 million, respectively.

Warranties

We provide a manufacturer's warranty on all new and used vehicles and a warranty on the installation and components of the energy generation and storage systems we sell for periods typically between 10 to 25 years. We accrue a warranty reserve for the products sold by us, which includes our best estimate of the projected costs to repair or replace items under warranties and recalls if identified. These estimates are based on actual claims incurred to date and an estimate of the nature, frequency and costs of future claims. These estimates are inherently uncertain given our relatively short history of sales, and changes to our historical or projected warranty experience may cause material changes to the warranty reserve in the future. The warranty reserve does not include projected warranty costs associated with our vehicles subject to operating lease accounting and our solar energy systems under lease contracts or PPAs, as the costs to repair these warranty claims are expensed as incurred. The portion of the warranty reserve expected to be incurred within the next 12 months is included within Accrued liabilities and other, while the remaining balance is included within Other long-term liabilities on the consolidated balance sheets. Warranty expense is recorded as a component of Cost of revenues in the consolidated statements of operations. Due to the magnitude of our automotive business, accrued warranty balance is primarily related to our automotive segment. Accrued warranty activity consisted of the following (in millions):

	Year Ended December 31,		
	2022	**2021**	**2020**
Accrued warranty—beginning of period	$ 2,101	$ 1,468	$ 1,089
Warranty costs incurred	(803)	(525)	(312)
Net changes in liability for pre-existing warranties, including expirations and foreign exchange impact	522	102	66
Provision for warranty	1,685	1,056	625
Accrued warranty—end of period	$ 3,505	$ 2,101	$ 1,468

Customer Deposits

Customer deposits primarily consist of cash payments from customers at the time they place an order or reservation for a vehicle or an energy product and any additional payments up to the point of delivery or the completion of installation. Customer deposits also include prepayments on contracts that can be cancelled without significant penalties, such as vehicle maintenance plans. Customer deposit amounts vary depending on the vehicle model, the energy product and the country of delivery. With the exception of a nominal order fee, customer deposits are fully refundable on vehicles prior to delivery and fully refundable in the case of an energy generation or storage product prior to the entry into a purchase agreement or in certain cases for a limited time thereafter (in accordance with applicable laws). Customer deposits are included in current liabilities until refunded, forfeited or applied towards the customer's purchase balance.

Government Assistance Programs and Incentives

Globally, the operation of our business is impacted by various government programs, incentives, and other arrangements. Government incentives are recorded in our consolidated financial statements in accordance with their purpose as a reduction of expense, or an offset to the related capital asset. The benefit is generally recorded when all conditions attached to the incentive have been met or are expected to be met and there is reasonable assurance of their receipt. The government incentives received by us are immaterial in all periods presented since the adoption of ASU 2021-10.

Gigafactory New York—New York State Investment and Lease

We have a lease through the Research Foundation for the SUNY Foundation with respect to Gigafactory New York. Under the lease and a related research and development agreement, we are continuing to designate further buildouts at the facility. We are required to comply with certain covenants, including hiring and cumulative investment targets. Under the terms of the arrangement, the SUNY Foundation paid for a majority of the construction costs related to the manufacturing facility and the acquisition and commissioning of certain manufacturing equipment; and we are responsible for any construction or equipment costs in excess of such amount (refer to Note 15, *Commitments and Contingencies*). This incentive reduces the related lease costs of the facility within the Energy generation and storage cost of revenues and operating expense line items in our consolidated statements of operations.

Gigafactory Shanghai—Land Use Rights and Economic Benefits

We have an agreement with the local government of Shanghai for land use rights at Gigafactory Shanghai. Under the terms of the arrangement, we are required to meet a cumulative capital expenditure target and an annual tax revenue target starting at the end of 2023. In addition, the Shanghai government has granted to our Gigafactory Shanghai subsidiary certain incentives to be used in connection with eligible capital investments at Gigafactory Shanghai (refer to Note 15, *Commitments and Contingencies*). For the years ended December 31, 2022 and 2021, we received grant funding of $76 million and $6 million, respectively. These incentives offset the related costs of our facilities and are recorded as a reduction of the cost of the capital investment within the Property, plant and equipment, net line item in our consolidated balance sheets. The incentive therefore reduces the depreciation expense over the useful lives of the related equipment.

Nevada Tax Incentives

In connection with the construction of Gigafactory Nevada, we entered into agreements with the State of Nevada and Storey County in Nevada that provide abatements for specified taxes, discounts to the base tariff energy rates and transferable tax credits of up to $195 million in consideration of capital investment and hiring targets that were met at Gigafactory Nevada.

Gigafactory Texas Tax Incentives

In connection with the construction of Gigafactory Texas, we entered into a 20-year agreement with Travis County in Texas pursuant to which we would receive grant funding equal to 70-80% of property taxes paid by us to Travis County and a separate 10-year agreement with the Del Valle Independent School District in Texas pursuant to which a portion of the taxable value of our property would be capped at a specified amount, in each case subject to our meeting certain minimum economic development metrics through our construction and operations at Gigafactory Texas. This incentive is recorded as a reduction of the related expenses within the Cost of automotive revenues and operating expense line items of our consolidated statements of operations.

Defined Contribution Plan

We have a 401(k) savings plan in the U.S. that is intended to qualify as a deferred salary arrangement under Section 401(k) of the Internal Revenue Code and a number of savings plans internationally. Under the 401(k) savings plan, participating employees may elect to contribute up to 90% of their eligible compensation, subject to certain limitations. Beginning in January 2022, we began to match 50% of each employee’s contributions up to a maximum of 6% (capped at $3,000) of the employee’s eligible compensation, vested upon one year of service. We recognized $91 million of expenses related to employer contributions for the 401(k) savings plan during the year ended December 31, 2022.

Recent Accounting Pronouncements

Recently issued accounting pronouncements not yet adopted

In October 2021, the Financial Accounting Standards Board (“FASB”) issued ASU No. 2021-08, Accounting for Contract Assets and Contract Liabilities from Contracts with Customers (Topic 805). This ASU requires an acquirer in a business combination to recognize and measure contract assets and contract liabilities (deferred revenue) from acquired contracts using the revenue recognition guidance in Topic 606. At the acquisition date, the acquirer applies the revenue model as if it had originated the acquired contracts. The ASU is effective for annual periods beginning after December 15, 2022, including interim periods within those fiscal years. Adoption of the ASU should be applied prospectively. Early adoption is also permitted, including adoption in an interim period. If early adopted, the amendments are applied retrospectively to all business combinations for which the acquisition date occurred during the fiscal year of adoption. This ASU is currently not expected to have a material impact on our consolidated financial statements.

In March 2022, the FASB issued ASU 2022-02, Troubled Debt Restructurings and Vintage Disclosures. This ASU eliminates the accounting guidance for troubled debt restructurings by creditors that have adopted ASU 2016-13, Measurement of Credit Losses on Financial Instruments, which we adopted on January 1, 2020. This ASU also enhances the disclosure requirements for certain loan refinancing and restructurings by creditors when a borrower is experiencing financial difficulty. In addition, the ASU amends the guidance on vintage disclosures to require entities to disclose current period gross write-offs by year of origination for financing receivables and net investments in leases within the scope of ASC 326-20. The ASU is effective for annual periods beginning after December 15, 2022, including interim periods within those fiscal years. Adoption of the ASU would be applied prospectively. Early adoption is also permitted, including adoption in an interim period. This ASU is currently not expected to have a material impact on our consolidated financial statements.

On August 16, 2022, the IRA was enacted into law and is effective for taxable years beginning after December 31, 2022. The IRA includes multiple incentives to promote clean energy, electric vehicles, battery and energy storage manufacture or purchase, in addition to a new corporate alternative minimum tax of 15% on adjusted financial statement income of corporations with profits greater than $1 billion. These measures may materially affect our consolidated financial statements, and we will continue to evaluate the applicability and effect of the IRA as more guidance is issued.

Recently adopted accounting pronouncements

In December 2022, the FASB issued ASU No. 2022-06, Deferral of the Sunset Date of Reference Rate Reform (Topic 848). Topic 848 provides optional expedients and exceptions for applying GAAP to transactions affected by reference rate (e.g., LIBOR) reform if certain criteria are met, for a limited period of time to ease the potential burden in accounting for (or recognizing the effects of) reference rate reform on financial reporting. The ASU deferred the sunset date of Topic 848 from December 31, 2022 to December 31, 2024. The ASU is effective as of December 21, 2022 through December 31, 2024. We continue to evaluate transactions or contract modifications occurring as a result of reference rate reform and determine whether to apply the optional guidance on an ongoing basis. We adopted ASU 2022-06 during 2022. The ASU has not and is currently not expected to have a material impact on our consolidated financial statements.

In November 2021, the FASB issued ASU No. 2021-10, Government Assistance (Topic 832). This ASU requires business entities to disclose information about government assistance they receive if the transactions were accounted for by analogy to either a grant or a contribution accounting model. The disclosure requirements include the nature of the transaction and the related accounting policy used, the line items on the balance sheets and statements of operations that are affected and the amounts applicable to each financial statement line item and the significant terms and conditions of the transactions. The ASU is effective for annual periods beginning after December 15, 2021. The disclosure requirements can be applied either retrospectively or prospectively to all transactions in the scope of the amendments that are reflected in the financial statements at the date of initial application and new transactions that are entered into after the date of initial application. We adopted the ASU prospectively on January 1, 2022. Adoption of this ASU did not have a material impact on our consolidated financial statements.

ASU 2020-06

In August 2020, the FASB issued ASU 2020-06, Accounting for Convertible Instruments and Contracts in an Entity’s Own Equity. The ASU simplifies the accounting for convertible instruments by removing certain separation models in ASC 470-20, Debt—Debt with Conversion and Other Options, for convertible instruments. The ASU updates the guidance on certain embedded conversion features that are not required to be accounted for as derivatives under Topic 815, Derivatives and Hedging, or that do not result in substantial premiums accounted for as paid-in capital, such that those features are no longer required to be separated from the host contract. The convertible debt instruments will be accounted for as a single liability measured at amortized cost. This will also result in the interest expense recognized for convertible debt instruments to be typically closer to the coupon interest rate when applying the guidance in Topic 835, Interest. Further, the ASU made amendments to the EPS guidance in Topic 260 for convertible debt instruments, the most significant impact of which is requiring the use of the if-converted method for diluted EPS calculation, and no longer allowing the net share settlement method. The ASU also made revisions to Topic 815-40, which provides guidance on how an entity must determine whether a contract qualifies for a scope exception from derivative accounting. The amendments to Topic 815-40 change the scope of contracts that are recognized as assets or liabilities.

On January 1, 2021, we adopted the ASU using the modified retrospective method. We recognized a cumulative effect of initially applying the ASU as an adjustment to the January 1, 2021 opening balance of accumulated deficit. Due to the recombination of the equity conversion component of our convertible debt remaining outstanding, additional paid in capital and convertible senior notes (mezzanine equity) were reduced. The removal of the remaining debt discounts recorded for this previous separation had the effect of increasing our net debt balance and the reduction of property, plant and equipment was related to previously capitalized interest. The prior period consolidated financial statements have not been retrospectively adjusted and continue to be reported under the accounting standards in effect for those periods.

Accordingly, the cumulative effect of the changes made on our January 1, 2021 consolidated balance sheet for the adoption of the ASU was as follows (in millions):

	Balances at December 31, 2020	Adjustments from Adoption of ASU 2020-06	Balances at January 1, 2021
Assets			
Property, plant and equipment, net	$ 12,747	$ (45)	$ 12,702
Liabilities			
Current portion of debt and finance leases	2,132	50	2,182
Debt and finance leases, net of current portion	9,556	219	9,775
Mezzanine equity			
Convertible senior notes	51	(51)	—
Equity			
Additional paid-in capital	27,260	(474)	26,786
Accumulated deficit	(5,399)	211	(5,188)

Note 3 – Digital Assets, Net

During the years ended December 31, 2022 and 2021, we purchased and/or received an immaterial amount and $1.50 billion, respectively, of digital assets. As of December 31, 2022, we have converted approximately 75% of our purchases into fiat currency. During the years ended December 31, 2022 and 2021, we recorded $204 million and $101 million of impairment losses on such digital assets, respectively. During the years ended December 31, 2022 and 2021, we realized gains of $64 million and $128 million, respectively, in connection with converting our holdings of digital assets into fiat currency. The gains are presented net of impairment losses in Restructuring and other in the consolidated statements of operations. As of December 31, 2022 and 2021, the carrying value of our digital assets held was $184 million and $1.26 billion, which reflects cumulative impairments of $204 million and $101 million, each period, respectively. The fair market value of such digital assets held as of December 31, 2022 and 2021 was $191 million and $1.99 billion, respectively.

Note 4 – Goodwill and Intangible Assets

Goodwill decreased $6 million within the automotive segment from $200 million as of December 31, 2021 to $194 million as of December 31, 2022. There were no accumulated impairment losses as of December 31, 2022 and 2021.

The net carrying value of our intangible assets decreased from $257 million as of December 31, 2021 to $215 million as of December 31, 2022 mainly from amortization.

Note 5 – Fair Value of Financial Instruments

ASC 820 states that fair value is an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or a liability. The three-tiered fair value hierarchy, which prioritizes which inputs should be used in measuring fair value, is comprised of: (Level I) observable inputs such as quoted prices in active markets; (Level II) inputs other than quoted prices in active markets that are observable either directly or indirectly and (Level III) unobservable inputs for which there is little or no market data. The fair value hierarchy requires the use of observable market data when available in determining fair value. Our assets and liabilities that were measured at fair value on a recurring basis were as follows (in millions):

	December 31, 2022				December 31, 2021			
	Fair Value	Level I	Level II	Level III	Fair Value	Level I	Level II	Level III
Money market funds	$ 2,188	$ 2,188	$ —	$ —	$ 9,548	$ 9,548	$ —	$ —
U.S. government securities	894	—	894	—	—	—	—	—
Corporate debt securities	885	—	885	—	131	—	131	—
Certificates of deposit and time deposits	4,253	—	4,253	—	—	—	—	—
Interest rate swap liabilities	—	—	—	—	31	—	31	—
Total	$ 8,220	$ 2,188	$ 6,032	$ —	$ 9,710	$ 9,548	$ 162	$ —

All of our money market funds were classified within Level I of the fair value hierarchy because they were valued using quoted prices in active markets. Our U.S. government securities, certificates of deposit, time deposits and corporate debt securities are classified within Level II of the fair value hierarchy and the market approach was used to determine fair value of these investments. Our interest rate swaps were classified within Level II of the fair value hierarchy because they were valued using alternative pricing sources or models that utilized market observable inputs, including current and forward interest rates.

Our cash, cash equivalents and investments classified by security type as of December 31, 2022 and 2021 consisted of the following (in millions):

	December 31, 2022					
	Adjusted Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value	Cash and Cash Equivalents	Short-Term Investments
Cash	$ 13,965	$ —	$ —	$ 13,965	$ 13,965	$ —
Money market funds	2,188	—	—	2,188	2,188	—
U.S. government securities	897	—	(3)	894	—	894
Corporate debt securities	907	—	(22)	885	—	885
Certificates of deposit and time deposits	4,252	1	—	4,253	100	4,153
Total cash, cash equivalents and short-term investments	$ 22,209	$ 1	$ (25)	$ 22,185	$ 16,253	$ 5,932

	December 31, 2021					
	Adjusted Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value	Cash and Cash Equivalents	Short-Term Investments
Cash	$ 8,028	$ —	$ —	$ 8,028	$ 8,028	$ —
Money market funds	9,548	—	—	9,548	9,548	—
Corporate debt securities	132	—	(1)	131	—	131
Total cash, cash equivalents and short-term investments	$ 17,708	$ —	$ (1)	$ 17,707	$ 17,576	$ 131

We record gross realized gains, losses and credit losses as a component of Other (expense) income, net in the consolidated statements of operations. For the years ended December 31, 2022 and 2021, we did not recognize any material gross realized gains, losses or credit losses. The ending allowance balances for credit losses were immaterial as of December 31, 2022 and December 31, 2021. We have determined that the gross unrealized losses on our investments as of December 31, 2022 and December 31, 2021 were temporary in nature.

The following table summarizes the fair value of our investments by stated contractual maturities as of December 31, 2022 (in millions):

Due in 1 year or less	$ 5,135
Due in 1 year through 5 years	636
Due in 5 years through 10 years	161
Total	$ 5,932

Disclosure of Fair Values

Our financial instruments that are not re-measured at fair value include accounts receivable, financing receivables, accounts payable, accrued liabilities, customer deposits and debt. The carrying values of these financial instruments approximate their fair values, other than our 2.375% Convertible Senior Notes due in 2022 (“2022 Notes”) and 2.00% Convertible Senior Notes due in 2024 (“2024 Notes”) (collectively referred to as “Convertible Senior Notes” below).

We estimate the fair value of the Convertible Senior Notes using commonly accepted valuation methodologies and market-based risk measurements that are indirectly observable, such as credit risk (Level II). The following table presents the estimated fair values and the carrying values (in millions):

	December 31, 2022		December 31, 2021	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Convertible Senior Notes (1)	$ 37	$ 223	$ 119	$ 2,016

(1) The 2022 Notes were fully settled in the first quarter of 2022.

Note 6 – Inventory

Our inventory consisted of the following (in millions):

	December 31, 2022	December 31, 2021
Raw materials	$ 6,137	$ 2,816
Work in process	2,385	1,089
Finished goods (1)	3,475	1,277
Service parts	842	575
Total	$ 12,839	$ 5,757

(1) Finished goods inventory includes vehicles in transit to fulfill customer orders, new vehicles available for sale, used vehicles and energy products available for sale.

For solar energy systems, we commence transferring component parts from inventory to construction in progress, a component of solar energy systems, once a lease or PPA contract with a customer has been executed and installation has been initiated. Additional costs incurred on the leased solar energy systems, including labor and overhead, are recorded within solar energy systems under construction.

We write-down inventory for any excess or obsolete inventories or when we believe that the net realizable value of inventories is less than the carrying value. During the years ended December 31, 2022, 2021 and 2020 we recorded write-downs of $144 million, $106 million and $145 million, respectively, in Cost of revenues in the consolidated statements of operations.

Note 7 – Solar Energy Systems, Net

Our solar energy systems, net, consisted of the following (in millions):

	December 31, 2022	December 31, 2021
Solar energy systems in service	$ 6,785	$ 6,809
Initial direct costs related to customer solar energy system lease acquisition costs	104	104
	6,889	6,913
Less: accumulated depreciation and amortization (1)	(1,418)	(1,187)
	5,471	5,726
Solar energy systems under construction	2	18
Solar energy systems pending interconnection	16	21
Solar energy systems, net (2)	$ 5,489	$ 5,765

(1) Depreciation and amortization expense during the years ended December 31, 2022, 2021 and 2020 was $235 million, $236 million and $232 million, respectively.

(2) As of December 31, 2022 and 2021, there were $802 million and $1.02 billion, respectively, of gross solar energy systems under lease pass-through fund arrangements with accumulated depreciation of $148 million and $165 million, respectively.

Note 8 – Property, Plant and Equipment, Net

Our property, plant and equipment, net, consisted of the following (in millions):

	December 31, 2022	December 31, 2021
Machinery, equipment, vehicles and office furniture	$ 13,558	$ 9,953
Tooling	2,579	2,188
Leasehold improvements	2,366	1,826
Land and buildings	7,751	4,675
Computer equipment, hardware and software	2,072	1,414
Construction in progress	4,263	5,559
	32,589	25,615
Less: Accumulated depreciation	(9,041)	(6,731)
Total	$ 23,548	$ 18,884

Construction in progress is primarily comprised of construction of Gigafactory Texas and Gigafactory Berlin-Brandenburg, and equipment and tooling related to the manufacturing of our products. Completed assets are transferred to their respective asset classes and depreciation begins when an asset is ready for its intended use. Interest on outstanding debt is capitalized during periods of significant capital asset construction and amortized over the useful lives of the related assets. During the years ended December 31, 2022, 2021 and 2020, we capitalized interest of an immaterial amount, $53 million and $48 million, respectively.

Depreciation expense during the years ended December 31, 2022, 2021 and 2020 was $2.42 billion, $1.91 billion and $1.57 billion, respectively.

Panasonic has partnered with us on Gigafactory Nevada with investments in the production equipment that it uses to manufacture and supply us with battery cells. Under our arrangement with Panasonic, we plan to purchase the full output from their production equipment at negotiated prices. As the terms of the arrangement convey a finance lease under ASC 842, we account for their production equipment as leased assets when production commences. We account for each lease and any non-lease components associated with that lease as a single lease component for all asset classes, except production equipment classes embedded in supply agreements. This results in us recording the cost of their production equipment within Property, plant and equipment, net, on the consolidated balance sheets with a corresponding liability recorded to debt and finance leases. Depreciation on Panasonic production equipment is computed using the units-of-production method whereby capitalized costs are amortized over the total estimated productive life of the respective assets. As of December 31, 2022 and 2021, we had cumulatively capitalized gross costs of $2.01 billion and $1.98 billion, respectively, on the consolidated balance sheets in relation to the production equipment under our Panasonic arrangement.

Note 9 – Accrued Liabilities and Other

Our accrued liabilities and other current liabilities consisted of the following (in millions):

	December 31, 2022	December 31, 2021
Accrued purchases (1)	$ 2,747	$ 2,045
Taxes payable (2)	1,235	1,122
Payroll and related costs	1,026	906
Accrued warranty reserve, current portion	1,025	703
Sales return reserve, current portion	270	265
Operating lease liabilities, current portion	485	368
Other current liabilities	354	310
Total	$ 7,142	$ 5,719

(1) Accrued purchases primarily reflects receipts of goods and services for which we had not yet been invoiced. As we are invoiced for these goods and services, this balance will reduce and accounts payable will increase. For the year ended December 31, 2022, accrued purchases increased as we continued construction and expansion of our facilities and operations.

(2) Taxes payable includes value added tax, sales tax, property tax, use tax and income tax payables.

Note 10 – Other Long-Term Liabilities

Our other long-term liabilities consisted of the following (in millions):

	December 31, 2022	December 31, 2021
Operating lease liabilities	$ 2,164	$ 1,671
Accrued warranty reserve	2,480	1,398
Sales return reserve	51	133
Deferred tax liability	82	24
Other non-current liabilities	553	320
Total other long-term liabilities	$ 5,330	$ 3,546

Note 11 – Debt

The following is a summary of our debt and finance leases as of December 31, 2022 (in millions):

	Net Carrying Value		Unpaid Principal Balance	Unused Committed Amount (1)	Contractual Interest Rates	Contractual Maturity Date
	Current	Long-Term				
Recourse debt:						
2024 Notes	$ —	$ 37	$ 37	$ —	2.00 %	May 2024
Credit Agreement	—	—	—	2,266	Not applicable	July 2023
Solar Bonds	—	7	7	—	4.70-5.75 %	March 2025 - January 2031
Total recourse debt	—	44	44	2,266		
Non-recourse debt:						
Automotive Asset-backed Notes	984	613	1,603	—	0.36-4.64 %	December 2023-September 2025
Solar Asset-backed Notes	4	13	17	—	4.80 %	December 2026
Cash Equity Debt	28	359	397	—	5.25-5.81 %	July 2033-January 2035
Automotive Lease-backed Credit Facilities	—	—	—	151	Not applicable	September 2024
Total non-recourse debt	1,016	985	2,017	151		
Total debt	1,016	1,029	$ 2,061	$ 2,417		
Finance leases	486	568				
Total debt and finance leases	$ 1,502	$ 1,597				

The following is a summary of our debt and finance leases as of December 31, 2021 (in millions):

	Net Carrying Value		Unpaid Principal Balance	Unused Committed Amount (1)	Contractual Interest Rates	Contractual Maturity Date
	Current	Long-Term				
Recourse debt:						
2022 Notes	$ 29	$ —	$ 29	$ —	2.375 %	March 2022
2024 Notes	1	89	91	—	2.00 %	May 2024
Credit Agreement	—	1,250	1,250	920	3.25 %	July 2023
Solar Bonds	0	7	7	—	4.00-5.75 %	January 2022-January 2031
Total recourse debt	30	1,346	1,377	920		
Non-recourse debt:						
Automotive Asset-backed Notes	1,007	1,706	2,723	—	0.12-5.48 %	September 2022-September 2025
Solar Asset and Loan-backed Notes	27	800	844	—	2.87-7.74 %	September 2024-September 2049
Cash Equity Debt	24	388	422	—	5.25-5.81 %	July 2033-January 2035
Automotive Lease-backed Credit Facilities	—	—	—	167	Not applicable	September 2023
Other Loans	—	14	14	21	5.10 %	February 2033
Total non-recourse debt	1,058	2,908	4,003	188		
Total debt	1,088	4,254	$ 5,380	$ 1,108		
Finance leases	501	991				
Total debt and finance leases	$ 1,589	$ 5,245				

(1) There are no restrictions on draw-down or use for general corporate purposes with respect to any available committed funds under our credit facilities, except certain specified conditions prior to draw-down, including pledging to our lenders sufficient amounts of qualified receivables, inventories, leased vehicles and our interests in those leases or various other assets and as may be described below.

Recourse debt refers to debt that is recourse to our general assets. Non-recourse debt refers to debt that is recourse to only assets of our subsidiaries. The differences between the unpaid principal balances and the net carrying values are due to debt discounts or deferred financing costs. As of December 31, 2022, we were in material compliance with all financial debt covenants.

2022 Notes, Bond Hedges and Warrant Transactions

During the first quarter of 2022, the remaining $29 million in aggregate principal amount of the 2022 Notes was converted and settled in cash for their par amount, and 1.2 million shares of our common stock were issued for the applicable conversion premium, as adjusted to give effect to the 2022 Stock Split. The note hedges we entered into in connection with the issuance of the 2022 Notes were automatically settled with the respective conversions of the 2022 Notes, resulting in the receipt of 1.2 million shares of our common stock during the same period, as adjusted to give effect to the 2022 Stock Split. Additionally, during the year ended December 31, 2022, we fully settled the warrants entered into in connection with the issuance of the 2022 Notes, resulting in the issuance of 37.0 million shares of our common stock, as adjusted to give effect to the 2022 Stock Split.

2024 Notes, Bond Hedges and Warrant Transactions

In May 2019, we issued $1.84 billion in aggregate principal amount of our 2024 Notes in a public offering. The net proceeds from the issuance, after deducting transaction costs, were $1.82 billion.

As adjusted to give effect to the 2022 Stock Split, each $1,000 of principal of the 2024 Notes is now convertible into 48.4140 shares of our common stock, which is equivalent to a conversion price of approximately $20.66 per share, subject to adjustment upon the occurrence of specified events. Holders of the 2024 Notes may convert, at their option, on or after February 15, 2024. Further, holders of the 2024 Notes may convert, at their option, prior to February 15, 2024 only under the following circumstances: (1) during any calendar quarter commencing after September 30, 2019 (and only during such calendar quarter), if the last reported sale price of our common stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each trading day; (2) during the five-business day period after any five-consecutive trading day period in which the trading price per $1,000 principal amount of the 2024 Notes for each trading day of such period is less than 98% of the product of the last reported sale price of our common stock and the conversion rate on each such trading day, or (3) if specified corporate events occur. Upon conversion, the 2024 Notes will be settled in cash, shares of our common stock or a combination thereof, at our election. If a fundamental change occurs prior to the maturity date, holders of the 2024 Notes may require us to repurchase all or a portion of their 2024 Notes for cash at a repurchase price equal to 100% of the principal amount plus any accrued and unpaid interest. In addition, if specific corporate events occur prior to the maturity date, we would increase the conversion rate for a holder who elects to convert its 2024 Notes in connection with such an event in certain circumstances. Early conversion of notes which are scheduled to settle in the following quarter are classified as current in our consolidated balance sheets.

In connection with the offering of the 2024 Notes, we entered into convertible note hedge transactions whereby we had the option to purchase 89.1 million shares of our common stock at a price of approximately $20.66 per share, as adjusted to give effect to the 2022 Stock Split. The cost of the convertible note hedge transactions was $476 million. In addition, we sold warrants whereby the holders of the warrants had the option to purchase 89.1 million shares of our common stock at a price of approximately $40.50 per share, as adjusted to give effect to the 2022 Stock Split. We received $174 million in cash proceeds from the sale of these warrants. Taken together, the purchase of the convertible note hedges and the sale of the warrants were intended to effectively increase the overall conversion price from approximately $20.66 to approximately $40.50 per share. As these transactions meet certain accounting criteria, the convertible note hedges and warrants were recorded in stockholders' equity and were not accounted for as derivatives. The net cost incurred in connection with the convertible note hedge and warrant transactions was recorded as a reduction to additional paid-in capital on the consolidated balance sheet.

The closing price of our common stock exceeded 130% of the applicable conversion price on at least 20 of the last 30 consecutive trading days of each quarter in 2022, causing the 2024 Notes to be convertible by their holders in the subsequent quarter. During the year ended December 31, 2022, $54 million in aggregate principal amount of the 2024 Notes was converted and settled in cash for their par amount, and 2.4 million shares of our common stock were issued for the applicable conversion premium, as adjusted to give effect to the 2022 Stock Split. The note hedges we entered into in connection with the issuance of the 2024 Notes were automatically settled with the respective conversions of the 2024 Notes, resulting in the receipt of 2.4 million shares of our common stock during the same period, as adjusted to give effect to the 2022 Stock Split. As of December 31, 2022, the if-converted value of the notes exceeds the outstanding principal amount by $186 million.

Credit Agreement

In June 2015, we entered into a senior asset-based revolving credit agreement (as amended from time to time, the "Credit Agreement") with a syndicate of banks. Borrowed funds bear interest, at our option, at an annual rate of (a) 1% plus LIBOR or (b) the highest of (i) the federal funds rate plus 0.50%, (ii) the lenders' "prime rate" or (iii) 1% plus LIBOR. The fee for undrawn amounts is 0.25% per annum. The Credit Agreement is secured by certain of our accounts receivable, inventory and equipment. Availability under the Credit Agreement is based on the value of such assets, as reduced by certain reserves.

In January 2023, we entered into a 5-year senior unsecured revolving credit facility (the "RCF Credit Agreement") with a syndicate of banks to replace the existing Credit Agreement, which was terminated. The RCF Credit Agreement contains two optional one-year extensions and has a total commitment of up to $5.00 billion, which could be increased up to $7.00 billion under certain circumstances. The underlying borrowings may be used for general corporate purposes. Borrowed funds accrue interest at a variable rate equal to: (i) for dollar-denominated loans, at our election, (a) Term SOFR (the forward-looking secured overnight financing rate) plus 0.10%, or (b) an alternate base rate; (ii) for loans denominated in pounds sterling, SONIA (the sterling overnight index average reference rate); or (iii) for loans denominated in euros, an adjusted EURIBOR (euro interbank offered rate); in each case, plus an applicable margin. The applicable margin will be based on the rating assigned to our senior, unsecured long-term indebtedness (the "Credit Rating") from time to time. The fee for undrawn amounts is variable based on the Credit Rating and is currently 0.15% per annum.

Automotive Asset-backed Notes

From time to time, we transfer receivables or beneficial interests related to certain leased vehicles into special purpose entities ("SPEs") and issue Automotive Asset-backed Notes, backed by these automotive assets to investors. The SPEs are consolidated in the financial statements. The cash flows generated by these automotive assets are used to service the principal and interest payments on the Automotive Asset-backed Notes and satisfy the SPEs' expenses, and any remaining cash is distributed to the owners of the SPEs. We recognize revenue earned from the associated customer lease contracts in accordance with our revenue recognition policy. The SPEs' assets and cash flows are not available to our other creditors, and the creditors of the SPEs, including the Automotive Asset-backed Note holders, have no recourse to our other assets.

Solar Asset and Loan-backed Notes

Our subsidiaries pooled and transferred qualifying solar energy systems and the associated customer contracts, our interests in certain financing funds or certain MyPower customer notes receivable into SPEs and issued Solar Asset and Loan-backed Notes backed by these solar assets, interests to investors or MyPower customer notes receivable. The SPEs are wholly owned by us and are consolidated in the financial statements. The cash flows generated by these solar assets and notes receivable, or distributed by the underlying financing funds to certain SPEs are used to service the principal and interest payments on the Solar Asset and Loan-backed Notes and satisfy the SPEs' expenses, and any remaining cash is distributed to us. The SPEs' assets and cash flows are not available to our other creditors, and the creditors of the SPEs, including the Solar Asset and Loan-backed Note holders, have no recourse to our other assets. We contracted with certain SPEs to provide operations & maintenance and administrative services for the solar energy systems. As of December 31, 2022, solar assets pledged as collateral for Solar Asset and Loan-backed Notes had a carrying value of $69 million and are included within Solar energy systems, net, on the consolidated balance sheet.

During the year ended December 31, 2022, we early repaid $819 million in aggregate principal of the Solar Asset and Loan-backed Notes and recorded an extinguishment of debt charge of $24 million related to the early repayments in Interest expense in the consolidated statement of operations.

Cash Equity Debt

In connection with the cash equity financing deals closed in 2016, our subsidiaries issued $502 million in aggregate principal amount of debt that bears interest at fixed rates. This debt is secured by, among other things, our interests in certain financing funds and is non-recourse to our other assets.

Automotive Lease-backed Credit Facilities

Our subsidiaries have entered into various credit agreements for borrowings secured by our interests in certain vehicle leases. These facilities are non-recourse to our other assets.

Pledged Assets

As of December 31, 2022 and 2021, we had pledged or restricted $2.02 billion and $5.25 billion of our assets (consisting principally of restricted cash, receivables, inventory, solar energy systems, operating lease vehicles, property and equipment and equity interests in certain SPEs) as collateral for our outstanding debt.

Schedule of Principal Maturities of Debt

The future scheduled principal maturities of debt as of December 31, 2022 were as follows (in millions):

	Recourse debt	Non-recourse debt	Total
2023	$ 0	$ 1,020	$ 1,020
2024	37	648	685
2025	4	35	39
2026	0	35	35
2027	—	25	25
Thereafter	3	254	257
Total	$ 44	$ 2,017	$ 2,061

Note 12 – Leases

We have entered into various operating and finance lease agreements for certain of our offices, manufacturing and warehouse facilities, retail and service locations, equipment, vehicles, and solar energy systems, worldwide. We determine if an arrangement is a lease, or contains a lease, at inception and record the leases in our financial statements upon lease commencement, which is the date when the underlying asset is made available for use by the lessor.

We have lease agreements with lease and non-lease components, and have elected to utilize the practical expedient to account for lease and non-lease components together as a single combined lease component, from both a lessee and lessor perspective with the exception of direct sales-type leases and production equipment classes embedded in supply agreements. From a lessor perspective, the timing and pattern of transfer are the same for the non-lease components and associated lease component and, the lease component, if accounted for separately, would be classified as an operating lease.

We have elected not to present short-term leases on the consolidated balance sheet as these leases have a lease term of 12 months or less at lease inception and do not contain purchase options or renewal terms that we are reasonably certain to exercise. All other lease assets and lease liabilities are recognized based on the present value of lease payments over the lease term at commencement date. Because most of our leases do not provide an implicit rate of return, we used our incremental borrowing rate based on the information available at lease commencement date in determining the present value of lease payments.

Our leases, where we are the lessee, often include options to extend the lease term for up to 10 years. Some of our leases also include options to terminate the lease prior to the end of the agreed upon lease term. For purposes of calculating lease liabilities, lease terms include options to extend or terminate the lease when it is reasonably certain that we will exercise such options.

Lease expense for operating leases is recognized on a straight-line basis over the lease term as cost of revenues or operating expenses depending on the nature of the leased asset. Certain operating leases provide for annual increases to lease payments based on an index or rate. We calculate the present value of future lease payments based on the index or rate at the lease commencement date for new leases. Differences between the calculated lease payment and actual payment are expensed as incurred. Amortization of finance lease assets is recognized over the lease term as cost of revenues or operating expenses depending on the nature of the leased asset. Interest expense on finance lease liabilities is recognized over the lease term within Interest expense in the consolidated statements of operations.

The balances for the operating and finance leases where we are the lessee are presented as follows (in millions) within our consolidated balance sheets:

	December 31, 2022	December 31, 2021
Operating leases:		
Operating lease right-of-use assets	$ 2,563	$ 2,016
Accrued liabilities and other	$ 485	$ 368
Other long-term liabilities	2,164	1,671
Total operating lease liabilities	$ 2,649	$ 2,039
Finance leases:		
Solar energy systems, net	$ 25	$ 27
Property, plant and equipment, net	1,094	1,536
Total finance lease assets	$ 1,119	$ 1,563
Current portion of long-term debt and finance leases	$ 486	$ 501
Long-term debt and finance leases, net of current portion	568	991
Total finance lease liabilities	$ 1,054	$ 1,492

The components of lease expense are as follows (in millions) within our consolidated statements of operations:

	Year Ended December 31,		
	2022	2021	2020
Operating lease expense:			
Operating lease expense (1)	$ 798	$ 627	$ 451
Finance lease expense:			
Amortization of leased assets	$ 493	$ 415	$ 348
Interest on lease liabilities	72	89	100
Total finance lease expense	$ 565	$ 504	$ 448
Total lease expense	$ 1,363	$ 1,131	$ 899

(1) Includes short-term leases and variable lease costs, which are immaterial.

Other information related to leases where we are the lessee is as follows:

	December 31, 2022	December 31, 2021
Weighted-average remaining lease term:		
Operating leases	6.4 years	6.5 years
Finance leases	3.1 years	4.2 years
Weighted-average discount rate:		
Operating leases	5.3 %	5.0 %
Finance leases	5.7 %	5.8 %

Supplemental cash flow information related to leases where we are the lessee is as follows (in millions):

	Year Ended December 31,		
	2022	2021	2020
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash outflows from operating leases	$ 754	$ 616	$ 456
Operating cash outflows from finance leases (interest payments)	$ 75	$ 89	$ 100
Financing cash outflows from finance leases	$ 502	$ 439	$ 338
Leased assets obtained in exchange for finance lease liabilities	$ 58	$ 486	$ 188
Leased assets obtained in exchange for operating lease liabilities	$ 1,059	$ 818	$ 553

As of December 31, 2022, the maturities of our operating and finance lease liabilities (excluding short-term leases) are as follows (in millions):

	Operating Leases	Finance Leases
2023	$ 610	$ 534
2024	558	387
2025	490	122
2026	383	52
2027	300	31
Thereafter	805	4
Total minimum lease payments	3,146	1,130
Less: Interest	497	76
Present value of lease obligations	2,649	1,054
Less: Current portion	485	486
Long-term portion of lease obligations	$ 2,164	$ 568

As of December 31, 2022, we have excluded from the table above additional operating leases that have not yet commenced with aggregate rent payments of $901 million. These operating leases will commence between fiscal year 2023 and 2024 with lease terms of 2 years to 15 years.

Operating Lease and Sales-type Lease Receivables

We are the lessor of certain vehicle and solar energy system arrangements as described in Note 2, *Summary of Significant Accounting Policies*. As of December 31, 2022, maturities of our operating lease and sales-type lease receivables from customers for each of the next five years and thereafter were as follows (in millions):

	Operating Leases	Sales-type Leases
2023	$ 1,212	$ 202
2024	900	208
2025	463	192
2026	215	174
2027	194	49
Thereafter	1,697	12
Gross lease receivables	$ 4,681	$ 837

The above table does not include vehicle sales to customers or leasing partners with a resale value guarantee as the cash payments were received upfront. For our solar PPA arrangements, customers are charged solely based on actual power produced by the installed solar energy system at a predefined rate per kilowatt-hour of power produced. The future payments from such arrangements are not included in the above table as they are a function of the power generated by the related solar energy systems in the future.

Net Investment in Sales-type Leases

Net investment in sales-type leases, which is the sum of the present value of the future contractual lease payments, is presented on the consolidated balance sheets as a component of Prepaid expenses and other current assets for the current portion and as Other non-current assets for the long-term portion. Lease receivables relating to sales-type leases are presented on the consolidated balance sheets as follows (in millions):

	December 31, 2022	December 31, 2021
Gross lease receivables	$ 837	$ 427
Unearned interest income	(95)	(50)
Allowance for expected credit losses	(4)	(1)
Net investment in sales-type leases	$ 738	$ 376
Reported as:		
Prepaid expenses and other current assets	$ 164	$ 73
Other non-current assets	574	303
Net investment in sales-type leases	$ 738	$ 376

Lease Pass-Through Financing Obligation

As of December 31, 2022, we have six transactions referred to as “lease pass-through fund arrangements.” Under these arrangements, our wholly owned subsidiaries finance the cost of solar energy systems with investors through arrangements contractually structured as master leases for an initial term ranging between 10 and 25 years. These solar energy systems are subject to lease or PPAs with customers with an initial term not exceeding 25 years.

Under a lease pass-through fund arrangement, the investor makes a large upfront payment to the lessor, which is one of our subsidiaries, and in some cases, subsequent periodic payments. As of December 31, 2022, the future minimum master lease payments to be received from investors, for each of the next five years and thereafter, were as follows (in millions):

2023	$ 26
2024	18
2025	27
2026	28
2027	29
Thereafter	366
Total	$ 494

Note 13 – Equity Incentive Plans

In June 2019, we adopted the 2019 Equity Incentive Plan (the “2019 Plan”). The 2019 Plan provides for the grant of stock options, restricted stock, RSUs, stock appreciation rights, performance units and performance shares to our employees, directors and consultants. Stock options granted under the 2019 Plan may be either incentive stock options or nonstatutory stock options. Incentive stock options may only be granted to our employees. Nonstatutory stock options may be granted to our employees, directors and consultants. Generally, our stock options and RSUs vest over four years and our stock options are exercisable over a maximum period of 10 years from their grant dates. Vesting typically terminates when the employment or consulting relationship ends.

As of December 31, 2022, 148.0 million shares were reserved and available for issuance under the 2019 Plan, as adjusted to give effect to the 2022 Stock Split.

The following table summarizes our stock option and RSU activity for the year ended December 31, 2022:

	Stock Options				RSUs	
	Number of Options (in thousands)	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (years)	Aggregate Intrinsic Value (in billions)	Number of RSUs (in thousands)	Weighted-Average Grant Date Fair Value
Beginning of period (1)	357,120	$ 28.15			34,312	$ 88.23
Granted	4,120	$ 226.53			8,714	$ 239.85
Exercised or released	(7,971)	$ 27.96			(17,702)	$ 61.74
Cancelled	(9,705)	$ 24.25			(3,991)	$ 140.68
End of period	343,564	$ 30.65	5.19	$ 32.79	21,333	$ 162.32
Vested and expected to vest, December 31, 2022	343,105	$ 30.61	5.19	$ 32.75	21,323	$ 162.33
Exercisable and vested, December 31, 2022 (2)	304,862	$ 25.68	5.08	$ 29.93		

(1) Prior period results have been adjusted to give effect to the 2022 Stock Split. See Note 1, *Overview*, for details.
(2) Tranche 12 of the 2018 CEO Performance Award, which represents 25.3 million stock options, was achieved in the fourth quarter of 2022 and will vest upon expected certification following the filing of this Annual Report on Form 10-K.

The weighted-average grant date fair value of RSUs granted in the years ended December 31, 2022, 2021 and 2020 was $239.85, $261.33 and $100.17, respectively, as adjusted to give effect to the 2022 Stock Split. The aggregate release date fair value of RSUs in the years ended December 31, 2022, 2021 and 2020 was $4.32 billion, $5.70 billion and $3.25 billion, respectively.

The aggregate intrinsic value of options exercised in the years ended December 31, 2022, 2021, and 2020 was $1.90 billion, $26.88 billion and $1.55 billion, respectively. During the year ended December 31, 2021, our CEO exercised all of the remaining vested options from the 2012 CEO Performance Award, which amounted to an intrinsic value of $23.45 billion.

ESPP

Our employees are eligible to purchase our common stock through payroll deductions of up to 15% of their eligible compensation, subject to any plan limitations. The purchase price would be 85% of the lower of the fair market value on the first and last trading days of each six-month offering period. During the years ended December 31, 2022, 2021 and 2020, under the ESPP we issued 1.4 million, 1.5 million and 5.5 million shares, respectively, as adjusted to give effect to the 2022 Stock Split. As of December 31, 2022, there were 99.9 million shares available for issuance under the ESPP, as adjusted to give effect to the 2022 Stock Split.

Fair Value Assumptions

We use the fair value method in recognizing stock-based compensation expense. Under the fair value method, we estimate the fair value of each stock option award with service or service and performance conditions and the ESPP on the grant date generally using the Black-Scholes option pricing model. The weighted-average assumptions used in the Black-Scholes model for stock options are as follows:

	Year Ended December 31,		
	2022	2021	2020
Risk-free interest rate	3.11 %	0.66 %	0.26 %
Expected term (in years)	4.1	4.3	3.9
Expected volatility	63 %	59 %	69 %
Dividend yield	0.0 %	0.0 %	0.0 %
Grant date fair value per share (1)	$ 114.51	$ 128.02	$ 72.05

(1) Prior period results have been adjusted to give effect to the 2022 Stock Split. See Note 1, *Overview*, for details.

The fair value of RSUs with service or service and performance conditions is measured on the grant date based on the closing fair market value of our common stock. The risk-free interest rate is based on the U.S. Treasury yield for zero-coupon U.S. Treasury notes with maturities approximating each grant's expected life. We use our historical data in estimating the expected term of our employee grants. The expected volatility is based on the average of the implied volatility of publicly traded options for our common stock and the historical volatility of our common stock.

2018 CEO Performance Award

In March 2018, our stockholders approved the Board of Directors' grant of 304.0 million stock option awards, as adjusted to give effect to the 2020 Stock Split and the 2022 Stock Split, to our CEO (the "2018 CEO Performance Award"). The 2018 CEO Performance Award consists of 12 vesting tranches with a vesting schedule based entirely on the attainment of both operational milestones (performance conditions) and market conditions, assuming continued employment either as the CEO or as both Executive Chairman and Chief Product Officer and service through each vesting date. Each of the 12 vesting tranches of the 2018 CEO Performance Award will vest upon certification by the Board of Directors that both (i) the market capitalization milestone for such tranche, which began at $100.0 billion for the first tranche and increases by increments of $50.0 billion thereafter (based on both a six calendar month trailing average and a 30 calendar day trailing average, counting only trading days), has been achieved, and (ii) any one of the following eight operational milestones focused on total revenue or any one of the eight operational milestones focused on Adjusted EBITDA have been achieved for the four consecutive fiscal quarters on an annualized basis and subsequently reported by us in our consolidated financial statements filed with our Forms 10-Q and/or 10-K. Adjusted EBITDA is defined as net income (loss) attributable to common stockholders before interest expense, provision (benefit) for income taxes, depreciation and amortization and stock-based compensation. Upon vesting and exercise, including the payment of the exercise price of $23.34 per share as adjusted to give effect to the 2020 Stock Split and the 2022 Stock Split, our CEO must hold shares that he acquires for five years post-exercise, other than a cashless exercise where shares are simultaneously sold to pay for the exercise price and any required tax withholding.

The achievement status of the operational milestones as of December 31, 2022 is provided below. Although an operational milestone is deemed achieved in the last quarter of the relevant annualized period, it may be certified only after the financial statements supporting its achievement have been filed with our Forms 10-Q and/or 10-K.

Total Annualized Revenue		Annualized Adjusted EBITDA	
Milestone (in billions)	Achievement Status	Milestone (in billions)	Achievement Status
$ 20.0	Achieved	$ 1.5	Achieved
$ 35.0	Achieved	$ 3.0	Achieved
$ 55.0	Achieved	$ 4.5	Achieved
$ 75.0	Achieved (1)	$ 6.0	Achieved
$ 100.0	-	$ 8.0	Achieved
$ 125.0	-	$ 10.0	Achieved
$ 150.0	-	$ 12.0	Achieved
$ 175.0	-	$ 14.0	Achieved

(1) Achieved in the fourth quarter of 2022 and expected to be certified following the filing of this Annual Report on Form 10-K.

Stock-based compensation under the 2018 CEO Performance Award represents a non-cash expense and is recorded as a Selling, general, and administrative operating expense in our consolidated statements of operations. In each quarter since the grant of the 2018 CEO Performance Award, we have recognized expense, generally on a pro-rated basis, for only the number of tranches (up to the maximum of 12 tranches) that corresponds to the number of operational milestones that have been achieved or have been determined probable of being achieved in the future, in accordance with the following principles.

On the grant date, a Monte Carlo simulation was used to determine for each tranche (i) a fixed amount of expense for such tranche and (ii) the future time when the market capitalization milestone for such tranche was expected to be achieved, or its “expected market capitalization milestone achievement time.” Separately, based on a subjective assessment of our future financial performance, each quarter we determine whether it is probable that we will achieve each operational milestone that has not previously been achieved or deemed probable of achievement and if so, the future time when we expect to achieve that operational milestone, or its “expected operational milestone achievement time.”

During the first quarter of 2022, three operational milestones were achieved and consequently, we recognized an aggregate catch-up expense of $11 million.

As of December 31, 2022, all remaining unrecognized stock-based compensation expense under the 2018 CEO Performance Award has been recognized. For the years ended December 31, 2022, 2021 and 2020, we recorded stock-based compensation expense of $66 million, $910 million and $838 million, respectively, related to the 2018 CEO Performance Award.

Other Performance-Based Grants

2021 Performance-Based Stock Option & RSU Awards

During the fourth quarter of 2021, the Compensation Committee of our Board of Directors granted to certain employees performance-based RSUs and stock options to purchase an aggregate 2.2 million shares of our common stock, as adjusted to give effect to the 2022 Stock Split. We begin recording stock-based compensation expense when the performance milestones become probable of achievement. Following achievement, vesting occurs over a two-year period with continued employment. As of December 31, 2022, we had unrecognized stock-based compensation expense of $204 million, which will be recognized over a weighted-average period of 3.2 years. For the year ended December 31, 2022, we recorded $159 million of stock-based compensation expense related to this grant, net of forfeitures.

Summary Stock-Based Compensation Information

The following table summarizes our stock-based compensation expense by line item in the consolidated statements of operations (in millions):

	Year Ended December 31,		
	2022	**2021**	**2020**
Cost of revenues	$ 594	$ 421	$ 281
Research and development	536	448	346
Selling, general and administrative	430	1,252	1,107
Total	$ 1,560	$ 2,121	$ 1,734

Our income tax benefits recognized from stock-based compensation arrangements in each of the periods presented were immaterial due to cumulative losses and valuation allowances. During the years ended December 31, 2022, 2021 and 2020, stock-based compensation expense capitalized to our consolidated balance sheets was $245 million, $182 million and $89 million, respectively. As of December 31, 2022, we had $3.94 billion of total unrecognized stock-based compensation expense related to non-performance awards, which will be recognized over a weighted-average period of 2.26 years.

Note 14 – Income Taxes

A provision for income taxes of $1.13 billion, $699 million and $292 million has been recognized for the years ended December 31, 2022, 2021 and 2020, respectively, related primarily to our subsidiaries located outside of the U.S. Our income before provision for income taxes for the years ended December 31, 2022, 2021 and 2020 was as follows (in millions):

	Year Ended December 31,		
	2022	2021	2020
Domestic	$ 5,524	$ (130)	$ (198)
Noncontrolling interest and redeemable noncontrolling interest	31	125	141
Foreign	8,164	6,348	1,211
Income before income taxes	$ 13,719	$ 6,343	$ 1,154

The components of the provision for income taxes for the years ended December 31, 2022, 2021 and 2020 consisted of the following (in millions):

	Year Ended December 31,		
	2022	2021	2020
Current:			
Federal	$ —	$ —	$ —
State	62	9	4
Foreign	1,266	839	248
Total current	1,328	848	252
Deferred:			
Federal	26	—	—
State	1	—	—
Foreign	(223)	(149)	40
Total deferred	(196)	(149)	40
Total provision for income taxes	$ 1,132	$ 699	$ 292

Deferred tax assets (liabilities) as of December 31, 2022 and 2021 consisted of the following (in millions):

	December 31, 2022	December 31, 2021
Deferred tax assets:		
Net operating loss carry-forwards	$ 4,486	$ 7,607
Research and development credits	1,184	923
Other tax credits and attributes	217	335
Deferred revenue	751	546
Inventory and warranty reserves	819	377
Stock-based compensation	185	115
Operating lease right-of-use liabilities	554	430
Capitalized research and development costs	693	—
Deferred GILTI tax assets	466	556
Accruals and others	178	191
Total deferred tax assets	9,533	11,080
Valuation allowance	(7,349)	(9,074)
Deferred tax assets, net of valuation allowance	2,184	2,006
Deferred tax liabilities:		
Depreciation and amortization	(1,178)	(1,279)
Investment in certain financing funds	(238)	(209)
Operating lease right-of-use assets	(506)	(391)
Deferred revenue	—	(49)
Other	(15)	(13)
Total deferred tax liabilities	(1,937)	(1,941)
Deferred tax assets (liabilities), net of valuation allowance	$ 247	$ 65

As of December 31, 2022, we recorded a valuation allowance of $7.35 billion for the portion of the deferred tax asset that we do not expect to be realized. The valuation allowance on our net deferred taxes decreased by $1.73 billion in the year ended December 31, 2022, and increased by $6.14 billion and $974 million during the years ended December 31, 2021 and 2020, respectively. The changes in valuation allowance are primarily due to changes in U.S. deferred tax assets and liabilities incurred in the respective year. The decrease in the year ended December 31, 2022 included utilization of $13.57 billion net operating loss carry forwards to offset our 2022 U.S. taxable income. We have $532 million of deferred tax assets in foreign jurisdictions, which management believes are more-likely-than-not to be realized given the expectation of future earnings in these jurisdictions. We did not have any material releases of valuation allowance for the years ended December 31, 2022, 2021 and 2020. We continue to monitor the realizability of the U.S. deferred tax assets taking into account multiple factors. In completing this assessment, we considered both objective and subjective factors. These factors included, but were not limited to, a history of losses in prior years, excess tax benefits related to stock-based compensation, future reversal of existing temporary differences and tax planning strategies. After evaluating all available evidence, we intend to continue maintaining a full valuation allowance on our U.S. deferred tax assets until there is sufficient evidence to support the reversal of all or some portion of these allowances. Given the improvement in our operating results and depending on the amount of stock-based compensation tax deductions available in the future, we may release the valuation allowance associated with the U.S. deferred tax assets in the next few years. Release of all, or a portion, of the valuation allowance would result in the recognition of certain deferred tax assets and a decrease to income tax expense for the period the release is recorded.

The reconciliation of taxes at the federal statutory rate to our provision for income taxes for the years ended December 31, 2022, 2021 and 2020 was as follows (in millions):

	Year Ended December 31,		
	2022	**2021**	**2020**
Tax at statutory federal rate	$ 2,881	$ 1,332	$ 242
State tax, net of federal benefit	51	6	4
Nondeductible executive compensations	14	201	184
Other nondeductible expenses	89	67	52
Excess tax benefits related to stock based compensation	(745)	(7,123)	(666)
Foreign income rate differential	(923)	(668)	33
U.S. tax credits	(276)	(328)	(181)
Noncontrolling interests and redeemable noncontrolling interests adjustment	42	11	5
GILTI inclusion	1,279	1,008	133
Unrecognized tax benefits	252	28	1
Change in valuation allowance	(1,532)	6,165	485
Provision for income taxes	$ 1,132	$ 699	$ 292

As of December 31, 2022, we had $18.0 billion of federal and $14.0 billion of state net operating loss carry-forwards available to offset future taxable income, some of which, if not utilized, will begin to expire in 2023 for federal and state purposes. A portion of these losses were generated by our acquisition of SolarCity Corporation ("SolarCity") and some of the other companies we acquired, and therefore are subject to change of control provisions, which limit the amount of acquired tax attributes that can be utilized in a given tax year. We do not expect the change of control limitations or expiration dates to significantly impact our ability to utilize these attributes.

As of December 31, 2022, we had research and development tax credits of $969 million and $734 million for federal and state income tax purposes, respectively. If not utilized, the federal research and development tax credits will expire in various amounts beginning in 2024. However, the state of California research and development tax credits can be carried forward indefinitely. In addition, we have other general business tax credits of $197 million for federal income tax purposes, which will not begin to significantly expire until 2033.

Federal and state laws can impose substantial restrictions on the utilization of net operating loss and tax credit carry-forwards in the event of an "ownership change," as defined in Section 382 of the Internal Revenue Code. We have determined that no significant limitation would be placed on the utilization of our net operating loss and tax credit carry-forwards due to prior ownership changes.

The local government of Shanghai granted a beneficial corporate income tax rate of 15% to certain eligible enterprises, compared to the 25% statutory corporate income tax rate in China. Our Gigafactory Shanghai subsidiary was granted this beneficial income tax rate of 15% for 2019 through 2023.

As of December 31, 2022, we intend to indefinitely reinvest our foreign earnings and cash unless such repatriation results in no or minimal tax costs. We have recorded the taxes associated with the earnings we intend to repatriate in the future. For the earnings we intend to indefinitely reinvest, no deferred tax liabilities for foreign withholding or other taxes have been recorded. The estimated amount of such unrecognized deferred tax liability associated with the indefinitely reinvested earnings is approximately $168 million.

Uncertain Tax Positions

The changes to our gross unrecognized tax benefits were as follows (in millions):

December 31, 2019	$	273
Increases in balances related to prior year tax positions		66
Increases in balances related to current year tax positions		41
December 31, 2020		380
Increases in balances related to prior year tax positions		117
Decreases in balances related to prior year tax positions		(90)
Increases in balances related to current year tax positions		124
December 31, 2021		531
Increases in balances related to prior year tax positions		136
Decreases in balances related to prior year tax positions		(12)
Increases in balances related to current year tax positions		222
Decreases in balances related to expiration of the statute of limitations		(7)
December 31, 2022	$	870

As of December 31, 2022, accrued interest and penalties related to unrecognized tax benefits are classified as income tax expense and amounted to $31 million. Unrecognized tax benefits of $572 million, if recognized, would not affect our effective tax rate since the tax benefits would increase a deferred tax asset that is currently fully offset by a valuation allowance.

We file income tax returns in the U.S. and various state and foreign jurisdictions. We are currently under examination by the Internal Revenue Service ("IRS") for the years 2015 to 2018. Additional tax years within the periods 2004 to 2014 and 2019 to 2021 remain subject to examination for federal income tax purposes. All net operating losses and tax credits generated to date are subject to adjustment for U.S. federal and state income tax purposes. Our returns for 2004 and subsequent tax years remain subject to examination in U.S. state and foreign jurisdictions.

Given the uncertainty in timing and outcome of our tax examinations, an estimate of the range of the reasonably possible change in gross unrecognized tax benefits within twelve months cannot be made at this time.

Note 15 – Commitments and Contingencies

Operating Lease Arrangement in Buffalo, New York

We have an operating lease through the Research Foundation for the SUNY Foundation with respect to Gigafactory New York. Under the lease and a related research and development agreement, we are continuing to further develop the facility.

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 the 10-year period beginning April 30, 2018. On an annual basis during the initial lease term, as measured on each anniversary of such date, if we fail to meet these specified investment and job creation requirements, then we would be obligated to pay a $41 million "program payment" to the SUNY Foundation for each year that we fail to meet these requirements. Furthermore, if the arrangement is terminated due to a material breach by us, then additional amounts may become payable by us.

In 2021, an amendment was executed to extend our overall agreement to spend or incur $5.00 billion in combined capital, operational expenses, costs of goods sold and other costs in the State of New York through December 31, 2029. On February 1, 2022, we reported to the State of New York that we had met and exceeded our annual requirements for jobs and investment in Buffalo and New York State. 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 and do not currently expect any issues meeting our applicable obligations in the years beyond. However, if our expectations as to the costs and timelines of our investment and operations at Buffalo or our production ramp of the Solar Roof prove incorrect, we may incur additional expenses or be required to make substantial payments to the SUNY Foundation.

Operating Lease Arrangement in Shanghai, China

We have an operating lease arrangement for an initial term of 50 years with the local government of Shanghai for land use rights where we have been constructing Gigafactory Shanghai. Under the terms of the arrangement, we are required to spend RMB 14.08 billion in capital expenditures by the end of 2023 and to generate RMB 2.23 billion of annual tax revenues starting at the end of 2023. If we are unwilling or unable to meet such target or obtain periodic project approvals, in accordance with the Chinese government's standard terms for such arrangements, we would be required to revert the site to the local government and receive compensation for the remaining value of the land lease, buildings and fixtures. We expect to meet the capital expenditure and tax revenue requirements based on our current level of spend and sales.

Legal Proceedings

Litigation Relating to the SolarCity Acquisition

Between September 1, 2016 and October 5, 2016, seven lawsuits were filed in the Delaware Court of Chancery by purported stockholders of Tesla challenging our acquisition of SolarCity. Following consolidation, the lawsuit names as defendants the members of Tesla's board of directors as then constituted and alleges, among other things, that board members breached their fiduciary duties in connection with the acquisition. The complaint asserts both derivative claims and direct claims on behalf of a purported class and seeks, among other relief, unspecified monetary damages, attorneys' fees and costs. On January 22, 2020, all of the director defendants except Elon Musk reached a settlement to resolve the lawsuit against them for an amount to be paid entirely under the applicable insurance policy. The settlement, which does not involve an admission of any wrongdoing by any party, was approved by the Court on August 17, 2020. Tesla received payment of approximately $43 million on September 16, 2020, which has been recognized in our consolidated statements of operations as a reduction to Selling, general and administrative operating expenses for costs previously incurred related to the acquisition of SolarCity. On February 4, 2020, the Court issued a ruling that denied plaintiffs' previously-filed motion for summary judgment and granted in part and denied in part defendants' previously-filed motion for summary judgment. The case was set for trial in March 2020 until it was postponed by the Court due to safety precautions concerning COVID-19. The trial was held from July 12 to July 23, 2021 and on August 16, 2021. On October 22, 2021, the Court approved the parties' joint stipulation that (a) the class is decertified and the action shall continue exclusively as a derivative action under Court of Chancery Rule 23.1 and (b) the direct claims against Elon Musk are dismissed with prejudice. Following post-trial briefing, post-trial argument was held on January 18, 2022.

On April 27, 2022, the Court entered judgment in favor of Mr. Musk on all counts. On May 26, 2022, the plaintiff filed a notice of appeal. The parties have completed briefing and argument will be held before the Supreme Court of Delaware on March 29, 2023.

These plaintiffs and others filed parallel actions in the U.S. District Court for the District of Delaware on or about April 21, 2017. They include claims for violations of the federal securities laws and breach of fiduciary duties by Tesla's board of directors. Those actions have been consolidated and stayed pending the above-referenced Chancery Court litigation.

Litigation Relating to 2018 CEO Performance Award

On June 4, 2018, a purported Tesla stockholder filed a putative class and derivative action in the Delaware Court of Chancery against Elon Musk and the members of Tesla's board of directors as then constituted, alleging corporate waste, unjust enrichment and that such board members breached their fiduciary duties by approving the stock-based compensation plan awarded to Elon Musk in 2018. The complaint seeks, among other things, monetary damages and rescission or reformation of the stock-based compensation plan. On August 31, 2018, defendants filed a motion to dismiss the complaint; plaintiff filed its opposition brief on November 1, 2018; and defendants filed a reply brief on December 13, 2018. The hearing on the motion to dismiss was held on May 9, 2019. On September 20, 2019, the Court granted the motion to dismiss as to the corporate waste claim but denied the motion as to the breach of fiduciary duty and unjust enrichment claims. Defendants' answer was filed on December 3, 2019.

On January 25, 2021, the Court conditionally certified certain claims and a class of Tesla stockholders as a class action. On September 30, 2021, plaintiff filed a motion for leave to file a verified amended derivative complaint. On October 1, 2021, defendants Kimbal Musk and Steve Jurvetson moved for summary judgment as to the claims against them. Following the motion, plaintiff agreed to voluntarily dismiss the claims against Kimbal Musk and Steve Jurvetson. Plaintiff also moved for summary judgment on October 1, 2021. On October 27, 2021, the Court approved the parties' joint stipulation that, among other things, (a) all claims against Kimbal Musk and Steve Jurvetson in the Complaint are dismissed with prejudice; (b) the class is decertified and the action shall continue exclusively as a derivative action under Court of Chancery Rule 23.1; and (c) the direct claims against the remaining defendants are dismissed with prejudice. On November 18, 2021, the remaining defendants (a) moved for partial summary judgment, (b) opposed plaintiff's summary judgment motion and (c) opposed the plaintiff's motion to amend his complaint. In January 2022, the case was assigned to a different judge. On February 24, 2022, the court (i) granted plaintiff's motion to amend his complaint, and (ii) canceled oral argument on the summary judgment motions, stating that the court is "skeptical that this litigation can be resolved based on the undisputed facts" and the "case is going to trial," but that the "parties may reassert their arguments made in support of summary judgment in their pre-trial and post-trial briefs." Trial was held November 14-18, 2022. Post-trial briefing is underway and post-trial argument is scheduled for February 21, 2023.

Litigation Related to Directors' Compensation

On June 17, 2020, a purported Tesla stockholder filed a derivative action in the Delaware Court of Chancery, purportedly on behalf of Tesla, against certain of Tesla's current and former directors regarding compensation awards granted to Tesla's directors, other than Elon Musk, between 2017 and 2020. The suit asserts claims for breach of fiduciary duty and unjust enrichment and seeks declaratory and injunctive relief, unspecified damages and other relief. Defendants filed their answer on September 17, 2020. Trial is currently set for November 27, 2023, to December 1, 2023.

Litigation Relating to Potential Going Private Transaction

Between August 10, 2018 and September 6, 2018, nine purported stockholder class actions were filed against Tesla and Elon Musk in connection with Mr. Musk's August 7, 2018 Twitter post that he was considering taking Tesla private. All of the suits are now pending in the U.S. District Court for the Northern District of California. Although the complaints vary in certain respects, they each purport to assert claims for violations of federal securities laws related to Mr. Musk's statement and seek unspecified compensatory damages and other relief on behalf of a purported class of purchasers of Tesla's securities. Plaintiffs filed their consolidated complaint on January 16, 2019 and added as defendants the members of Tesla's board of directors. The now-consolidated purported stockholder class action was stayed while the issue of selection of lead counsel was briefed and argued before the Ninth Circuit. The Ninth Circuit ruled regarding lead counsel. Defendants filed a motion to dismiss the complaint on November 22, 2019. The hearing on the motion was held on March 6, 2020. On April 15, 2020, the Court denied defendants' motion to dismiss. The parties stipulated to certification of a class of stockholders, which the court granted on November 25, 2020. On January 11, 2022, plaintiff filed a motion for partial summary judgment. On April 1, 2022, the Court granted in part plaintiffs' motion for partial summary judgment. The Company disagrees with the ruling and accordingly, on April 22, 2022, asked the Court for reconsideration or, in the alternative, certification to file an interlocutory appeal. On June 16, 2022, in response to Tesla's motions, the Court denied certification to appeal and declined to reconsider its opinion but clarified its summary judgment ruling to make clear that it had not ruled that any misstatements it identified met the required materiality element under the securities statute. The issue of materiality and reliance will both be questions for the jury to decide at trial, which started on January 17, 2023.

Between October 17, 2018 and March 8, 2021, seven derivative lawsuits were filed in the Delaware Court of Chancery, purportedly on behalf of Tesla, against Mr. Musk and the members of Tesla's board of directors, as constituted at relevant times, in relation to statements made and actions connected to a potential going private transaction, with certain of the lawsuits challenging additional Twitter posts by Mr. Musk, among other things. Five of those actions were consolidated, and all seven actions have been stayed pending resolution of the above-referenced consolidated purported stockholder class action. In addition to these cases, two derivative lawsuits were filed on October 25, 2018 and February 11, 2019 in the U.S. District Court for the District of Delaware, purportedly on behalf of Tesla, against Mr. Musk and the members of the Tesla board of directors as then constituted. Those cases have also been consolidated and stayed pending resolution of the above-referenced consolidated purported stockholder class action.

On October 21, 2022, a lawsuit was filed in the Delaware Court of Chancery by a purported shareholder of Tesla alleging, among other things, that board members breached their fiduciary duties in connection with their oversight of the Company's 2018 settlement with the SEC, as amended. Among other things, the plaintiff seeks reforms to the Company's corporate governance and internal procedures, unspecified damages, and attorneys' fees. The parties reached an agreement to stay the case until March 7, 2023.

Unless otherwise stated, the individual defendants named in the stockholder proceedings described above and the Company with respect to the stockholder class action proceedings described above believe that the claims in such proceedings have no merit and intend to defend against them vigorously. We are unable to reasonably estimate the possible loss or range of loss, if any, associated with these claims.

On November 15, 2021, JPMorgan Chase Bank ("JP Morgan") filed a lawsuit against Tesla in the Southern District of New York alleging breach of a stock warrant agreement that was entered into as part of a convertible notes offering in 2014. In 2018, JP Morgan informed Tesla that it had adjusted the strike price based upon Mr. Musk's August 7, 2018 Twitter post that he was considering taking Tesla private. Tesla disputed JP Morgan's adjustment as a violation of the parties' agreement. In 2021, Tesla delivered shares to JP Morgan per the agreement, which they duly accepted. JP Morgan now alleges that it is owed approximately $162 million as the value of additional shares that it claims should have been delivered as a result of the adjustment to the strike price in 2018. On January 24, 2022, Tesla filed multiple counterclaims as part of its answer to the underlying lawsuit, asserting among other points that JP Morgan should have terminated the stock warrant agreement in 2018 rather than make an adjustment to the strike price that it should have known would lead to a commercially unreasonable result. Tesla believes that the adjustments made by JP Morgan were neither proper nor commercially reasonable, as required under the stock warrant agreements. JP Morgan filed a motion for judgment on the pleadings, which Tesla opposed, and that motion is currently pending before the Court.

Litigation and Investigations Relating to Alleged Discrimination and Harassment

On October 4, 2021, in a case captioned *Diaz v. Tesla*, a jury in the Northern District of California returned a verdict of $136.9 million against Tesla on claims by a former contingent worker that he was subjected to race discrimination while assigned to work at Tesla's Fremont Factory from 2015-2016. On November 16, 2021, Tesla filed a post-trial motion for relief that included a request for a new trial or reduction of the jury's damages. The Court held a hearing on Tesla's motion on January 19, 2022. On April 13, 2022, the Court granted Tesla's motion in part, reducing the total damages to $15 million and conditionally denied the motion for a new trial subject to the plaintiff's acceptance of the reduced award. On June 21, 2022, the plaintiff rejected the reduced award and, as a result, on June 27, 2022, the Court ordered a new trial on damages only, to commence on March 27, 2023. Tesla continues to believe that the facts and law do not justify the damages awarded and is assessing its next steps.

On February 9, 2022, shortly after the *Diaz* jury verdict, the California Civil Rights Department ("CRD," formerly "DFEH") filed a civil complaint against Tesla in Alameda County, California Superior Court, alleging systemic race discrimination, hostile work environment and pay equity claims, among others. CRD's amended complaint seeks monetary damages and injunctive relief. On September 22, 2022, Tesla filed a cross complaint against CRD, alleging that it violated the Administrative Procedures Act by failing to follow statutory pre-requisites prior to filing suit and that cross complaint was subject to a sustained demurrer. Tesla has until February 3, 2023 to amend its cross complaint. The case is now in discovery.

Additionally, on June 1, 2022 the Equal Employment Opportunity Commission ("EEOC") issued a cause finding against Tesla that closely parallels the CRD's allegations. Tesla is in the process of setting up a mandatory mediation with the EEOC.

On June 16, 2022, two Tesla stockholders filed separate derivative actions in the U.S. District Court for the Western District of Texas, purportedly on behalf of Tesla, against certain of Tesla's current and former directors. Both suits assert claims for breach of fiduciary duty, unjust enrichment, and violation of the federal securities laws in connection with alleged race and gender discrimination and sexual harassment. Among other things, plaintiffs seek declaratory and injunctive relief, unspecified damages payable to Tesla, and attorneys' fees. On July 22, 2022, the Court consolidated the two cases and on September 6, 2022, plaintiffs filed a consolidated complaint. On November 7, 2022, the defendants filed a motion to dismiss the case. Plaintiffs filed a response of January 13, 2023, and the defendants' reply is due February 17, 2023.

Certain Investigations and Other Matters

We receive requests for information from regulators and governmental authorities, such as the National Highway Traffic Safety Administration, the National Transportation Safety Board, the SEC, the Department of Justice ("DOJ") and various state, federal, and international agencies. We routinely cooperate with such regulatory and governmental requests, including subpoenas, formal and informal requests and other investigations and inquiries.

For example, the SEC had issued subpoenas to Tesla in connection with Elon Musk's prior statement that he was considering taking Tesla private. The take-private investigation was resolved and closed with a settlement entered into with the SEC in September 2018 and as further clarified in April 2019 in an amendment. The SEC also has periodically issued subpoenas to us seeking information on our governance processes around compliance with the SEC settlement, as amended.

Separately, the company has received requests from the DOJ for documents related to Tesla's Autopilot and FSD features. To our knowledge no government agency in any ongoing investigation has concluded that any wrongdoing occurred. We cannot predict the outcome or impact of any ongoing matters. Should the government decide to pursue an enforcement action, there exists the possibility of a material adverse impact on our business, results of operation, prospects, cash flows and financial position.

We are also subject to various other legal proceedings and claims that arise from the normal course of business activities. If an unfavorable ruling or development were to occur, there exists the possibility of a material adverse impact on our business, results of operations, prospects, cash flows, financial position and brand.

Letters of Credit

As of December 31, 2022, we had $318 million of unused letters of credit outstanding.

Note 16 – Variable Interest Entity Arrangements

We have entered into various arrangements with investors to facilitate the funding and monetization of our solar energy systems and vehicles. In particular, our wholly owned subsidiaries and fund investors have formed and contributed cash and assets into various financing funds and entered into related agreements. We have determined that the funds are VIEs and we are the primary beneficiary of these VIEs by reference to the power and benefits criterion under ASC 810. We have considered the provisions within the agreements, which grant us the power to manage and make decisions that affect the operation of these VIEs, including determining the solar energy systems and the associated customer contracts to be sold or contributed to these VIEs, redeploying solar energy systems and managing customer receivables. We consider that the rights granted to the fund investors under the agreements are more protective in nature rather than participating.

As the primary beneficiary of these VIEs, we consolidate in the financial statements the financial position, results of operations and cash flows of these VIEs, and all intercompany balances and transactions between us and these VIEs are eliminated in the consolidated financial statements. Cash distributions of income and other receipts by a fund, net of agreed upon expenses, estimated expenses, tax benefits and detriments of income and loss and tax credits, are allocated to the fund investor and our subsidiary as specified in the agreements.

Generally, our subsidiary has the option to acquire the fund investor's interest in the fund for an amount based on the market value of the fund or the formula specified in the agreements.

Upon the sale or liquidation of a fund, distributions would occur in the order and priority specified in the agreements.

Pursuant to management services, maintenance and warranty arrangements, we have been contracted to provide services to the funds, such as operations and maintenance support, accounting, lease servicing and performance reporting. In some instances, we have guaranteed payments to the fund investors as specified in the agreements. A fund's creditors have no recourse to our general credit or to that of other funds. Certain assets of the funds have been pledged as collateral for their obligations.

The aggregate carrying values of the VIEs' assets and liabilities, after elimination of any intercompany transactions and balances, in the consolidated balance sheets were as follows (in millions):

	December 31, 2022	December 31, 2021
Assets		
Current assets		
Cash and cash equivalents	$ 68	$ 87
Accounts receivable, net	22	24
Prepaid expenses and other current assets	274	152
Total current assets	364	263
Solar energy systems, net	4,060	4,515
Other non-current assets	404	276
Total assets	$ 4,828	$ 5,054
Liabilities		
Current liabilities		
Accrued liabilities and other	$ 69	$ 74
Deferred revenue	10	11
Current portion of debt and finance leases	1,013	1,031
Total current liabilities	1,092	1,116
Deferred revenue, net of current portion	149	161
Debt and finance leases, net of current portion	971	2,093
Other long-term liabilities	3	11
Total liabilities	$ 2,215	$ 3,381

Note 17 – Related Party Transactions

In February 2020, our CEO and a member of our Board of Directors purchased from us 195,555 and 18,750 shares, respectively, as adjusted to give effect to the 2022 Stock Split, of our common stock in a public offering at the public offering price for an aggregate $10 million and $1 million, respectively.

In June 2020, our CEO entered into an indemnification agreement with us for an interim term of 90 days. During the interim term, we resumed our annual evaluation of all available options for providing directors’ and officers’ indemnity coverage, which we had suspended during the height of shelter-in-place requirements related to the COVID-19 pandemic. As part of such process, we obtained a binding market quote for a directors’ and officers’ liability insurance policy with an aggregate coverage limit of $100 million.

Pursuant to the indemnification agreement, our CEO provided, from his personal funds, directors’ and officers’ indemnity coverage to us during the interim term in the event such coverage is not indemnifiable by us, up to a total of $100 million. In return, we paid our CEO a total of $3 million, which represents the market-based premium for the market quote described above as prorated for 90 days and further discounted by 50%. Following the lapse of the 90-day period, we did not extend the term of the indemnification agreement with our CEO and instead bound a customary directors’ and officers’ liability insurance policy with third-party carriers.

In relation to our CEO’s exercise of stock options and sale of common stock from the 2012 CEO Performance Award, Tesla withheld the appropriate amount of taxes. However, given the significant amounts involved, our CEO entered into an indemnification agreement with us in November 2021 for additional taxes owed, if any.

Tesla periodically does business with certain entities with which its CEO and directors are affiliated, such as SpaceX and Twitter, Inc., in accordance with our Related Person Transactions Policy. Such transactions have not had to date, and are not currently expected to have, a material impact on our consolidated financial statements.

Note 18 – Segment Reporting and Information about Geographic Areas

We have two operating and reportable segments: (i) automotive and (ii) energy generation and storage. The automotive segment includes the design, development, manufacturing, sales and leasing of electric vehicles as well as sales of automotive regulatory credits. Additionally, the automotive segment is also comprised of services and other, which includes non-warranty after-sales vehicle services and parts, paid Supercharging, sales of used vehicles, retail merchandise 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 CODM does not evaluate operating segments using asset or liability information. The following table presents revenues and gross profit by reportable segment (in millions):

	Year Ended December 31,		
	2022	2021	2020
Automotive segment			
Revenues	$ 77,553	$ 51,034	$ 29,542
Gross profit	$ 20,565	$ 13,735	$ 6,612
Energy generation and storage segment			
Revenues	$ 3,909	$ 2,789	$ 1,994
Gross profit	$ 288	$ (129)	$ 18

The following table presents revenues by geographic area based on the sales location of our products (in millions):

	Year Ended December 31,		
	2022	2021	2020
United States	$ 40,553	$ 23,973	$ 15,207
China	18,145	13,844	6,662
Other	22,764	16,006	9,667
Total	$ 81,462	$ 53,823	$ 31,536

The following table presents long-lived assets by geographic area (in millions):

	December 31, 2022	December 31, 2021
United States	$ 21,667	$ 19,026
Germany	3,547	2,606
China	2,978	2,415
Other international	845	602
Total	$ 29,037	$ 24,649

The following table presents inventory by reportable segment (in millions):

	December 31, 2022	December 31, 2021
Automotive	$ 10,996	$ 4,978
Energy generation and storage	1,843	779
Total	$ 12,839	$ 5,757

Note 19 – Restructuring and Other

During the years ended December 31, 2022 and 2021, we recorded $204 million and $101 million, respectively, of impairment losses on digital assets. During the years ended December 31, 2022 and 2021, we also realized gains of $64 million and $128 million, respectively, in connection with converting our holdings of digital assets into fiat currency. Additionally, we recorded other expenses of $36 million in the second quarter during the year ended December 31, 2022.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures pursuant to Rule 13a-15 under the Securities Exchange Act of 1934, as amended (the “Exchange Act”). In designing and evaluating the disclosure controls and procedures, our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that our management is required to apply its judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Based on this evaluation, our Chief Executive Officer and our Chief Financial Officer concluded that, as of December 31, 2022, our disclosure controls and procedures were designed at a reasonable assurance level and were effective to provide reasonable assurance that the information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and our Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosures.

Management’s Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, our Chief Executive Officer and Chief Financial Officer to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that (1) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of our assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”). Our management concluded that our internal control over financial reporting was effective as of December 31, 2022.

Our independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of our internal control over financial reporting as of December 31, 2022, as stated in their report which is included herein.

Limitations on the Effectiveness of Controls

Because of inherent limitations, internal control over financial reporting may not prevent or detect misstatements and projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting that occurred during the quarter ended December 31, 2022, which has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this Item 10 of Form 10-K will be included in our 2023 Proxy Statement to be filed with the Securities and Exchange Commission in connection with the solicitation of proxies for our 2023 Annual Meeting of Stockholders and is incorporated herein by reference. The 2023 Proxy Statement will be filed with the Securities and Exchange Commission within 120 days after the end of the fiscal year to which this report relates.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this Item 11 of Form 10-K will be included in our 2023 Proxy Statement and is incorporated herein by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this Item 12 of Form 10-K will be included in our 2023 Proxy Statement and is incorporated herein by reference.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information required by this Item 13 of Form 10-K will be included in our 2023 Proxy Statement and is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this Item 14 of Form 10-K will be included in our 2023 Proxy Statement and is incorporated herein by reference.