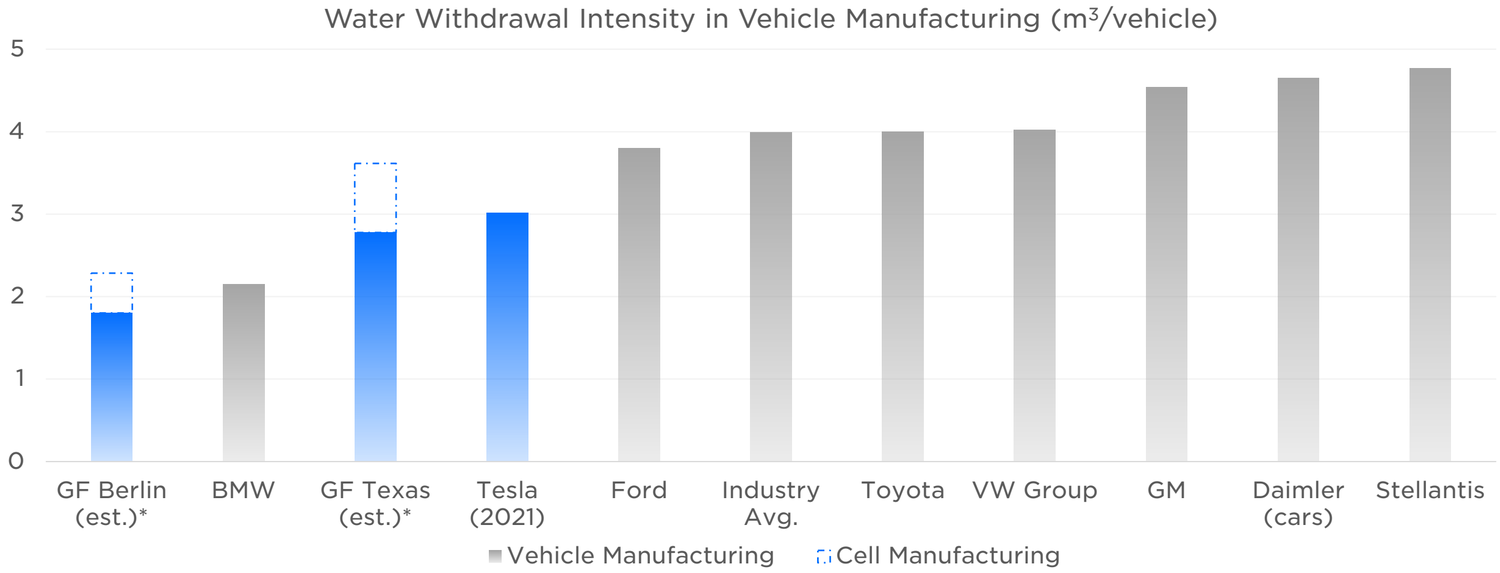
Water Used Per Vehicle Manufactured
Current State

We currently use less water per vehicle than almost any ICE carmaker

There is a misconception that producing an EV requires more water than producing an ICE vehicle. Our data shows this is not the case. While each automaker may draw their boundaries slightly differently (depending on how vertically integrated they are), according to the latest publicly available figures, Tesla withdrew less water at facilities dedicated to vehicle manufacturing per vehicle produced than the majority of established carmakers. Furthermore, the efficient manufacturing design we are implementing at our new factories in Texas and Berlin-Brandenburg will result in further reductions in our water usage per vehicle. Our goal is to have industry-leading low water usage per vehicle, even when accounting for cell manufacturing. The below chart includes our latest estimates for water usage per vehicle at those facilities.

Water usage and power generation

While many recognize the impact that power generation has on GHG emissions, its impact on water consumption is less appreciated. Power generation is one of the leading causes of water withdrawal in the U.S., as water for thermoelectric power is used to generate electricity with steam-driven turbine generators and to cool power-producing equipment. This means that every kilowatt-hour (kWh) of clean solar energy produced not only lowers GHG emissions, but also lowers water consumption.



*Latest estimate for water consumption based on factory design. Actual production figures will not be known until factories are ramped to full production speed.

Water Used Per Vehicle Manufactured
Initiatives at Our Factories

Tesla factories are setting a new standard of water use per vehicle

Water is becoming increasingly scarce as the climate changes. That is why we are reducing our water usage throughout our operations as much as possible. We have prioritized direct use in manufacturing and will continue to explore the rest of our impact throughout the supply chain and in sales, service and delivery.

The “cooling tower makeup” is the single biggest contributor to water usage in any car factory after paint operations. As water that cools machinery evaporates, it needs to be topped up regularly. The total cooling tower makeup could be offset entirely by non-potable sources such as rainwater or wastewater. These are some of the initiatives we are taking at Gigafactory Berlin-Brandenburg and/or Gigafactory Texas in order to reduce water consumption per complete vehicle (including cells).

1. Water intensive process optimization: We are constantly looking into reducing water consumption by optimizing or eliminating water intensive production processes across our operations. At Gigafactory Berlin-Brandenburg, we use hybrid cooling towers, have eliminated quench tanks in casting and introduced cascade rinsing systems in the paint shop and battery can wash process for cell manufacturing.

2. Rainwater and condensate harvesting and reuse: We are planning to capture at least 25% of roof runoff (1 million square feet) to a central underground storage system within Gigafactory Texas. Rainwater will be recycled for use in the cooling of manufacturing equipment. In an average year, such systems should save an estimated 7.5 million gallons of potable city water. Additionally, as hot, humid outdoor air is conditioned, water condenses out of the air. Typically, this condensate is discarded as wastewater. At Gigafactory Texas, we reuse this condensate in our cooling towers and process water systems to offset incoming site water.

3. Reclaimed and recycled water (wastewater reuse): Using local treated wastewater could result in offsetting the entire annual cooling tower makeup water demand with non-drinkable uses. At Gigafactory Texas, this could result in an estimated 40 million gallons of potable city water conserved annually. Reclaimed water is available and under investigation for use at both Gigafactory Texas and Gigafactory Berlin-Brandenburg.

Emissions Credits
Accelerating Deployment of New Factories

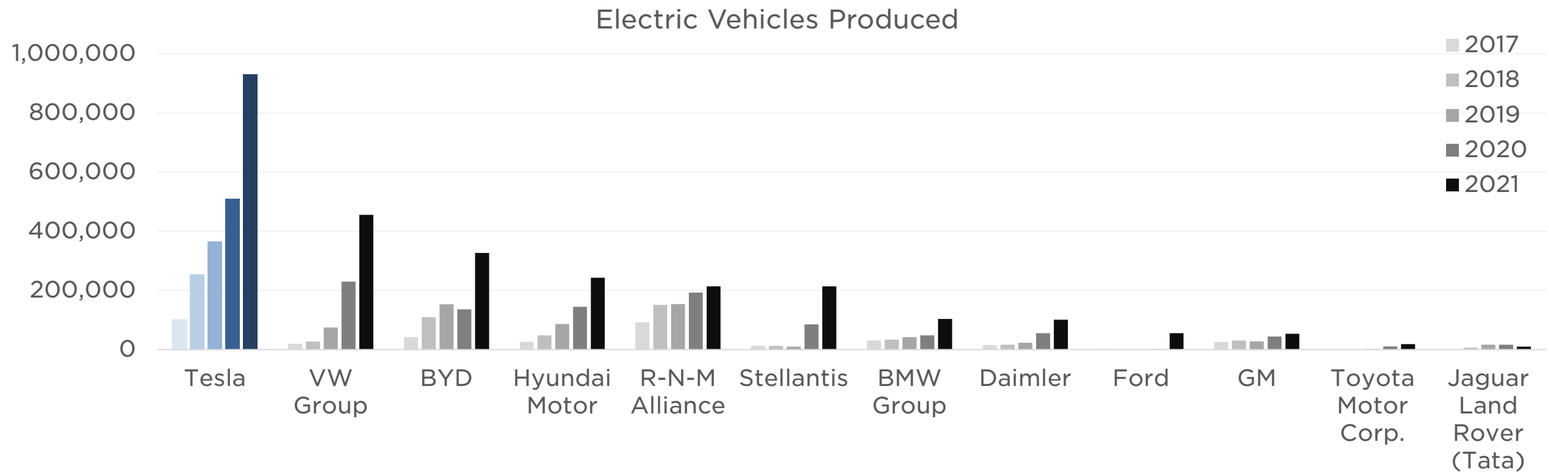
Emissions credit systems around the world are designed to economically benefit companies with non-polluting products by allowing them to sell their credits to polluting companies. In order to meet various countries' emission targets and avoid government fines, polluting companies pay non-polluting companies through credit purchases. The goal of this system is for every OEM to be incentivized to reduce emissions and themselves become non-polluting by selling more of their own manufactured EVs instead of paying another company for their non-polluting credits.

Emissions credit revenue is used for EV capacity expansion, which in turn displaces ICEs

In 2021, we generated almost $1.5 billion in revenue selling zero-emission regulatory credits to other OEMs. Proceeds from such sales will go towards building new factories to produce EVs that will continue to displace ICE vehicles. While it is common practice today for ICE vehicle OEMs to purchase regulatory credits from other companies (such as Tesla) to offset their total GHG emissions, it is not a sustainable strategy. In order to meet increasingly strict regulatory requirements across the world, OEMs will be forced to develop truly competitive EVs.

EV sales by all carmakers need to accelerate, taking market share from ICEs

In 2021, Tesla delivered almost 1 million EVs globally. We hope that every car manufacturer will strive to produce hundreds of thousands of EVs per year, as significant reduction of emissions will only be achieved if all carmakers push for an industry-wide shift to EVs.



Source: EV-volumes.com; Micro-cars not included. Tesla data are production volumes; other OEMs sales and delivery volumes are assumed to approximate their production for the year.

Product Impact

Vehicle Affordability
Price Equivalency Between EVs and ICE Vehicles

What Do We See As Impact?

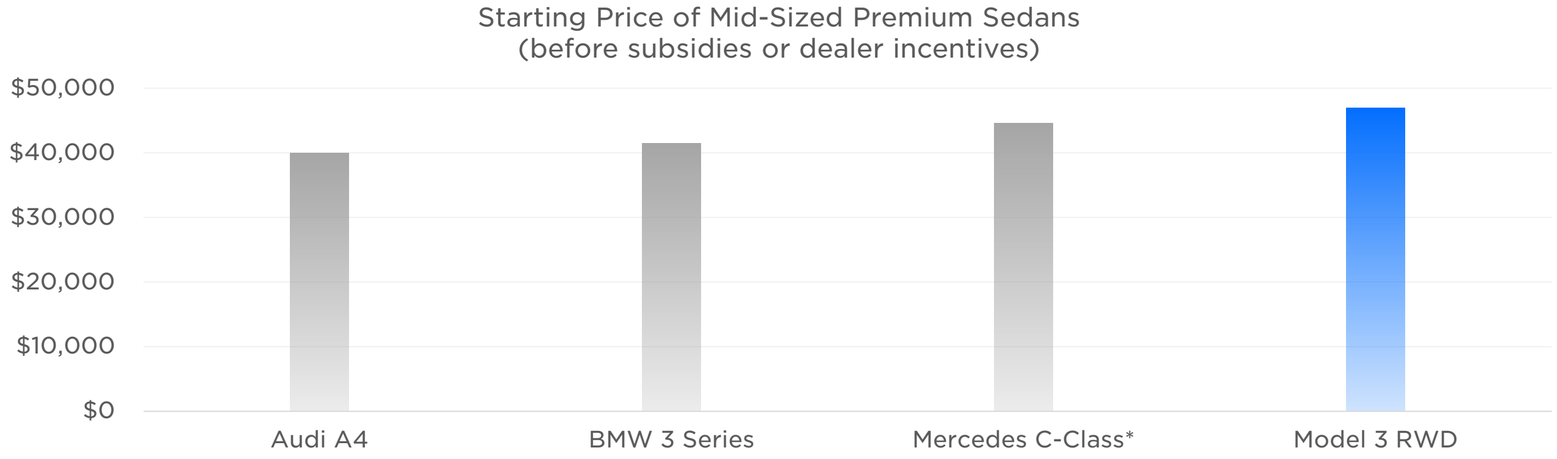
Consumers are unlikely to buy products only because they have a low lifetime carbon footprint. In order to convince consumers to buy our products, they need to be better in every way – performance, cost of ownership, safety, fun and more. We want to make products that people love.

Model 3 is the first EV to be priced on-par with ICE vehicle equivalents

Model 3 is the first EV in history priced competitively with its gas-powered equivalents, even before taking into consideration any regional subsidies and lower running costs. Unfortunately, most other EVs on the market today are often priced at over a $10,000 premium compared to their direct ICE vehicle equivalents.

There doesn't need to be a tradeoff between sustainability, performance and affordability

Tesla's ability to achieve our mission rests first and foremost on our products. We are not just trying to build the best electric cars, we are striving to build the best cars, period. Our focus from the beginning has been to develop products that are not only sustainable, but also superior to fossil-fuel alternatives in every way. Many incorrectly believe that choosing sustainable products requires consumers to compromise on price or performance, but Tesla vehicles combine performance, safety, efficiency and competitive prices. Similarly, Tesla's energy generation and storage products power both urban and remote communities with reliable, affordable energy.



Source: OEM websites; pricing as of March 2022.
*As reported by CarandDriver.com; Daimler has not yet disclosed pricing for 2022 C-Class.

Vehicle Affordability
Total Cost of Ownership

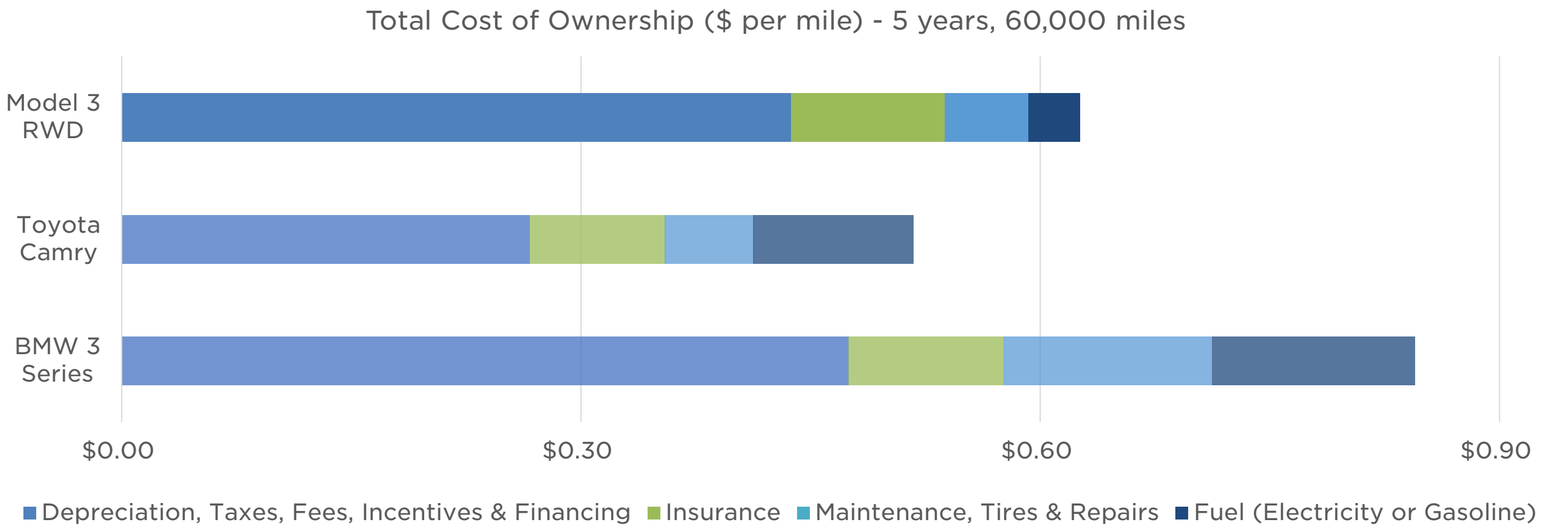
Over 5 years of average driving, the ownership costs of a Tesla Model 3 are closer to a Camry than a 3 Series

The accessibility of our products is fundamental to our mission. While the “sticker price” of Model 3 is similar to an equivalent BMW or Audi, the sticker price of a vehicle itself is only one of many cost items that need to be considered. The lifetime running costs of EVs are lower than those of ICE vehicles due to lower maintenance costs, cheap electricity and high residual value of used Tesla vehicles, the latter of which has remained exceptionally strong since our initial launch. As a result, Tesla Model 3 has a base price similar to BMW 3 Series, but the total cost of ownership per mile is closer to America’s best-selling sedan, the Toyota Camry*.

Cost data is based on data collected from our fleet

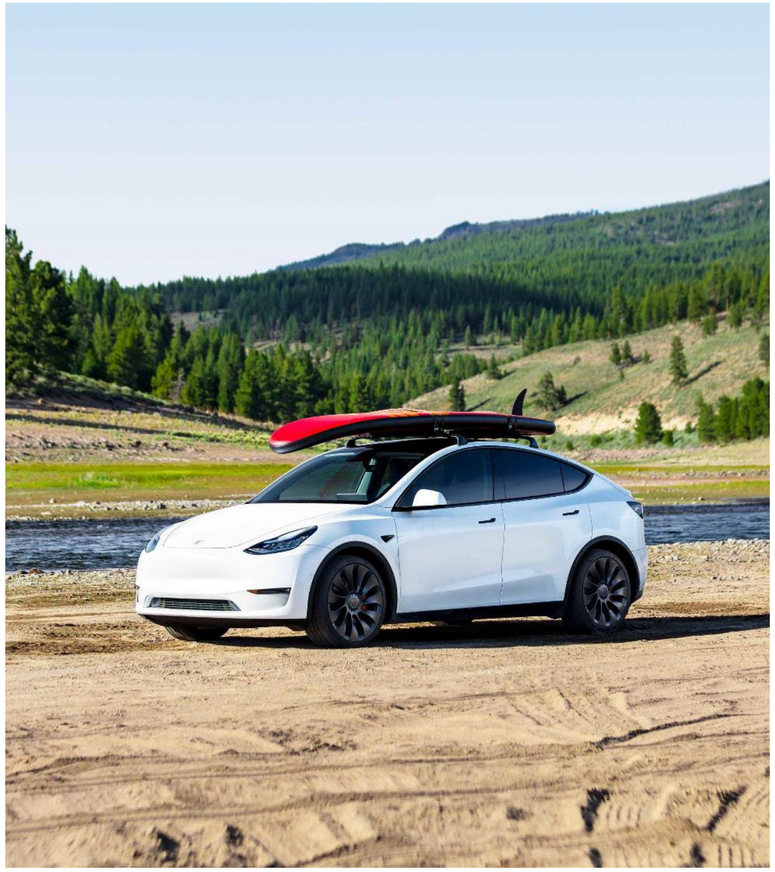
The advantage of having a fleet of vehicles that is constantly online is the ability to analyze real-world data rather than only being able to use estimates. We have an extensive database of Model 3 residual values and cost of repairs, maintenance, energy use, etc. Additionally, the insurance cost for the Model 3 RWD below is based on the projected median insurance rate in the U.S. for Tesla Model 3 drivers. Our analysis shows that over five years and 60,000 miles, running a Model 3 RWD costs 63 cents per mile.

Notably, running costs such as fuel (electricity or gasoline), maintenance, tires and repairs for Model 3 should cost just over half of a mass-market ICE vehicle such as a Toyota Camry.



*Based on model year 2021 vehicles. Please see page 137 for sources.

Vehicle Usage
EVs as the Primary Vehicle

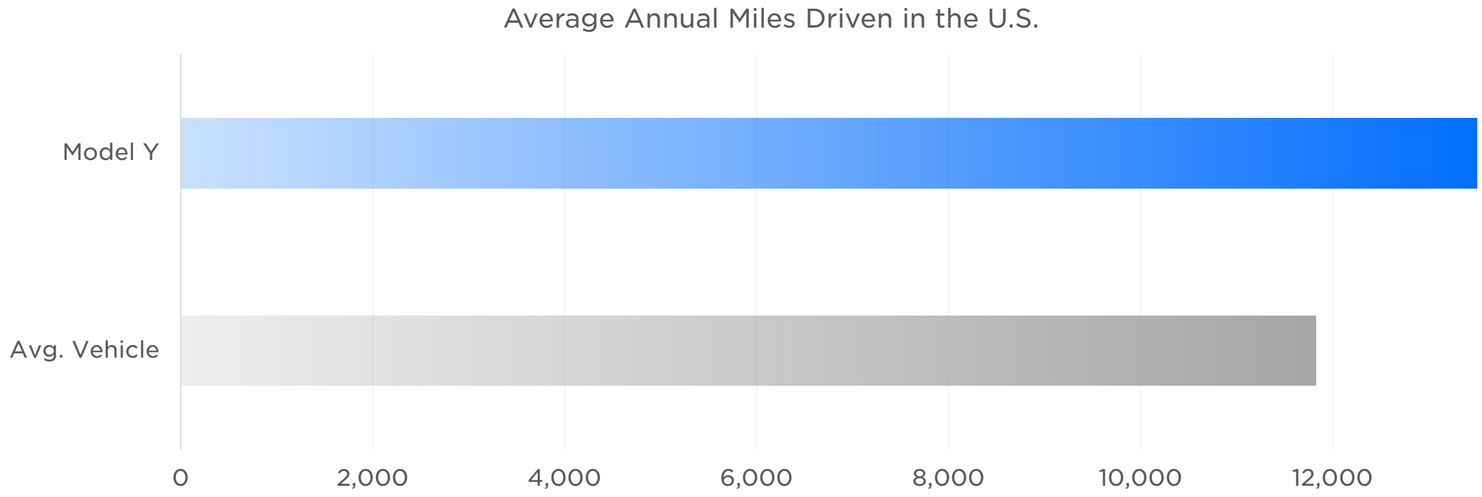


Customers are using their Tesla as their main car

For an EV to have an impact on the environment, it must be genuinely displacing internal combustion engine miles, rather than sitting in the driveway as a secondary car used for errands or short trips only. Our data shows that Tesla vehicles are being driven more than average vehicles in the U.S., suggesting that they are generally being used as a customer's primary vehicle. We fundamentally believe that you shouldn't have to choose between price, quality, usability and sustainability. An EV should be the best vehicle in every way, so consumers don't ever need to use ICE vehicles.

The longer the range, the higher the usage

There is a clear relationship between range, how often an EV is utilized and whether it is a primary-use vehicle. The more confident owners are that their EV can be used for commuting, errands and long road trips, the less they will feel they need to supplement their EV with an ICE vehicle. Surveys consistently indicate that the real or perceived lack of EV range is the key reason why many people do not consider replacing their ICE vehicle with an EV.



Freedom of travel is the reason people buy vehicles in the first place. To ensure we replace as many ICE vehicles with EVs as possible, we have been focused on increasing the range of Tesla vehicles. While most personal vehicle journeys are relatively short, and thus drivable on a single charge, consumers do not buy cars that can meet *most* of their driving needs; they buy a car that meets *all* their driving needs.

The longer the range, the lower the Supercharger use

Since its introduction in 2012, we have increased the range of the Model S by over 50%: from 265 miles to 405 miles of range for the long-range version. Our focus on energy efficiency — achieving superior range from the same size battery — has allowed to us continue to increase range while keeping the battery size relatively stable. Our data shows that the longer the range of our vehicles, the less Supercharging Tesla customers do. After all, day trips of over 400 miles are quite rare.

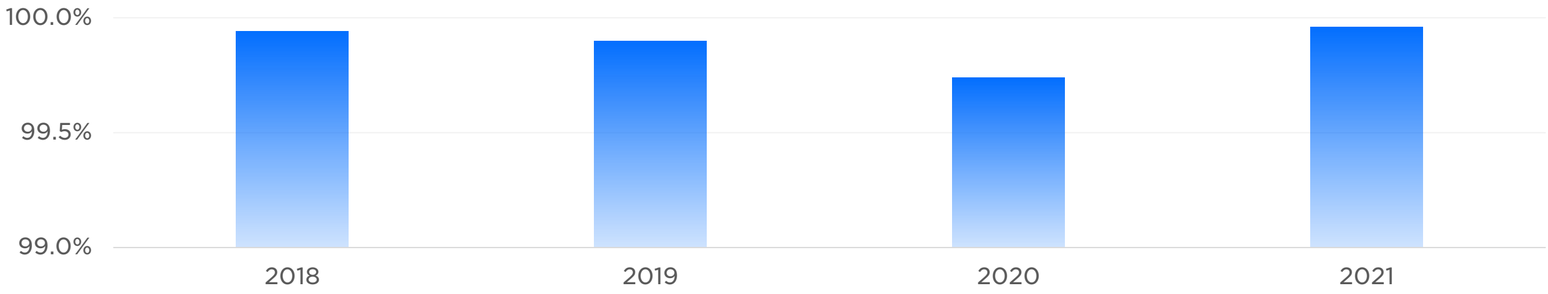
Super-fast charging: V3 Superchargers can increase range by up to 200 miles in just 15 minutes

Around 300 miles of range at highway speeds is equal to roughly four hours of driving. At that stage, drivers are often likely to take a break. We want to make sure that such a break can be relatively short before continuing the journey. Our latest generation of Superchargers can recover up to 200 miles of range in just 15 minutes of charging, long enough for a quick break and snack.

Substantial coverage and 99.96% reliability

We're aware that the chart showing Supercharger uptime looks silly, but that's kind of the point. While coverage is important, uptime is essential. Few things are as frustrating as arriving to a charging station with a near-empty battery, realizing that none of the charging plugs are working. In 2021 alone, we opened 912 new Supercharger locations around the world for a total of nearly 3,500 charging locations with over 31,000 plugs.

Uptime of Supercharger Sites[1]



[1]Uptime of Supercharger sites reflects the average percentage of sites globally that had at least 50% daily capacity functional for the year.

Safety Is Our Top Design Priority

At Tesla, safety features are not optional. Our full suite of safety features comes standard with every vehicle. When we design vehicles, first and foremost, we want them to be safe. This section of the Impact Report will detail our key efforts on the Vehicle Safety front.

IIHS Small Overlap Frontal Test – The Most Challenging Rating Test

Applies to both Model 3 and Model Y

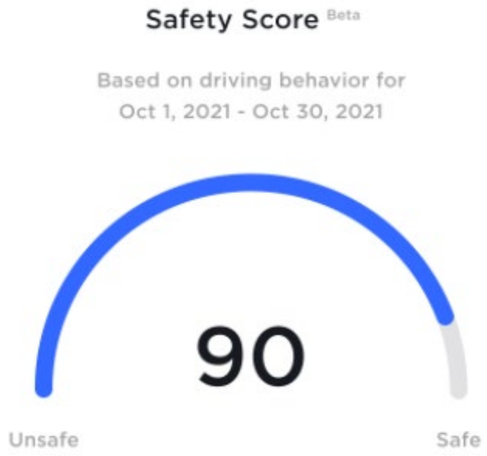
Safety Score^{Beta} – Incentivizing customers to drive safely

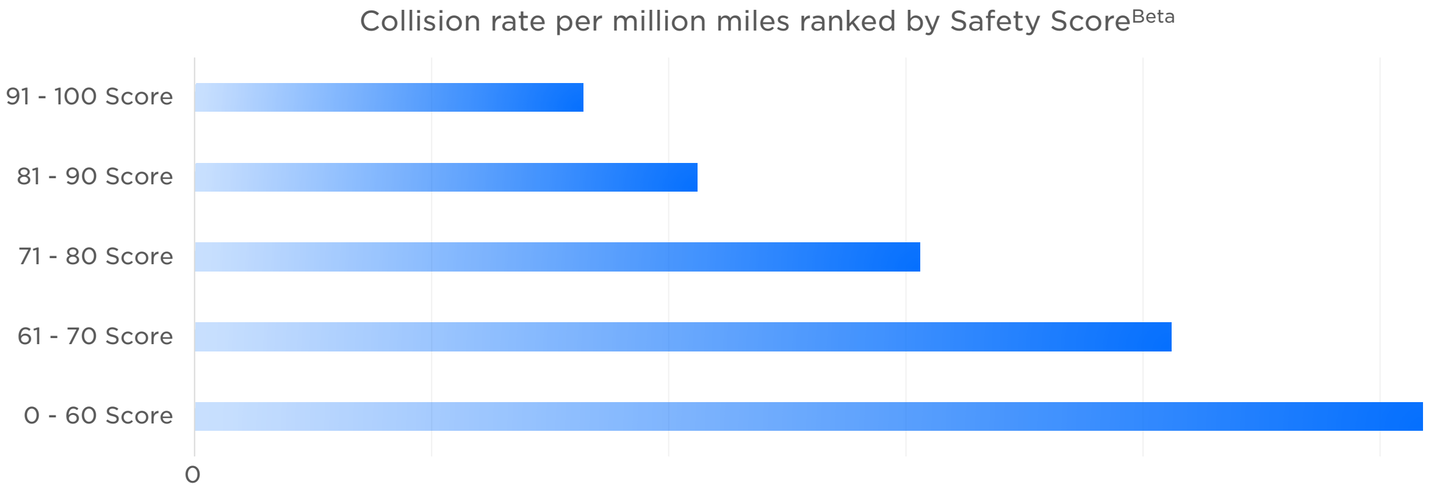
In addition to designing and building cars with the highest levels of real-world safety, we've also been working on ways to help our customers drive as safely as possible. Through our Tesla Insurance program, we do just this by providing real time feedback to customers and incentives for safe driving such as reductions in monthly insurance premiums.

Customers who choose to be a part of this program receive a Safety Score^{Beta}. This score changes based on driving behavior and the insurance premium changes with it. Instead of determining a driver's insurance premiums from demographic information (gender, age, education, or marital status) and financial history (credit score), our algorithm calculates Safety Score^{Beta} based on actual driver behavior. The behaviors we monitor are:

- Forward Collision Warnings
- Hard Braking
- Aggressive Turning
- Unsafe Following (Tailgating)
- Forced Autopilot Disengagement

Our data show a lower rate of collision for the cohort of customers who have enabled Safety Score^{Beta}. As the vehicle's Safety Score^{Beta} increases, the number of collisions per mile decreases and insurance premiums reduce.





Our commitment to safety is why all Tesla vehicles built since October 2016 come with a suite of external cameras, additional sensors and onboard computing that enable advanced safety features like Automatic Emergency Braking, Lane Departure Warning, Forward and Side Collision Warning, Obstacle-Aware Acceleration, blind spot warnings and more — all of which continue to improve over time through software updates. We recently introduced active safety features that go beyond the norm:

Traffic Light & Stop Sign Warning

When a driver doesn't notice a red light or a stop sign, our cars will notice that vehicle's speed is too high. Thanks to our eight-camera system, each vehicle can recognize a traffic light that is specific to vehicle's trajectory as well as a stop sign. A loud warning is triggered to alert the driver.

Pedal Misapplication Mitigation (accelerator pressed inadvertently)

Pressing the accelerator pedal when the circumstances indicate you should be pressing the brake instead, like when pulling into a parking space, is relatively common no matter what vehicle you're in. However, if you are in a Tesla, when our cameras recognize an object in front of the car, "Pedal Misapplication Mitigation" system cuts torque from the electric motor to prevent a collision if you happen to press hard on the accelerator. This technology has prevented or mitigated hundreds of collisions every month.

Active avoidance of lane departure or a blind-spot collision

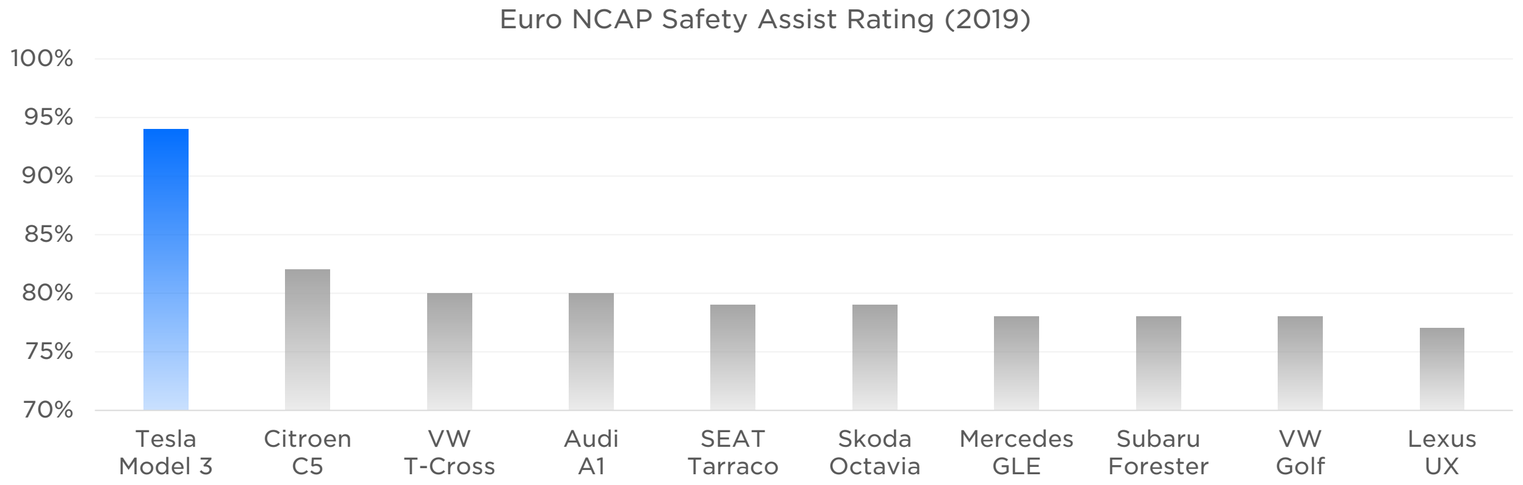
If a driver is changing into a lane while a vehicle in the blind spot is entering the same lane, or if our vehicle starts departing its lane without an indicator, our vehicles will sound a warning and assist the steering to avoid a collision.

Not all Active Safety systems are created equal

Many people assume that AEB (Automatic Emergency Breaking) – a system that most new vehicles are equipped with – works equally well with all vehicles. That's not the case. The range of sensors, compute power and quality of software in the system can vary dramatically. Our active safety features are powered by eight cameras, a neural-net computer and learnings from our fleet of over two million cars.

After the introduction of Tesla Vision (a vision-only system that excludes radar), our active safety ratings with IIHS improved. Pedestrian AEB performance of our Tesla Vision was over 45% better than performance of vision + radar. It is no surprise that the active safety score achieved by Tesla Model 3 Euro NCAP remains an outlier.

	Model X	Model 3	Model Y
Euro NCAP*	94%	94%	Scheduled for 2022
ANCAP* (Australasian New Car Assessment Program)	94%	94%	Scheduled for 2022
IIHS (Insurance Institute for Highway Safety)		Superior	Superior

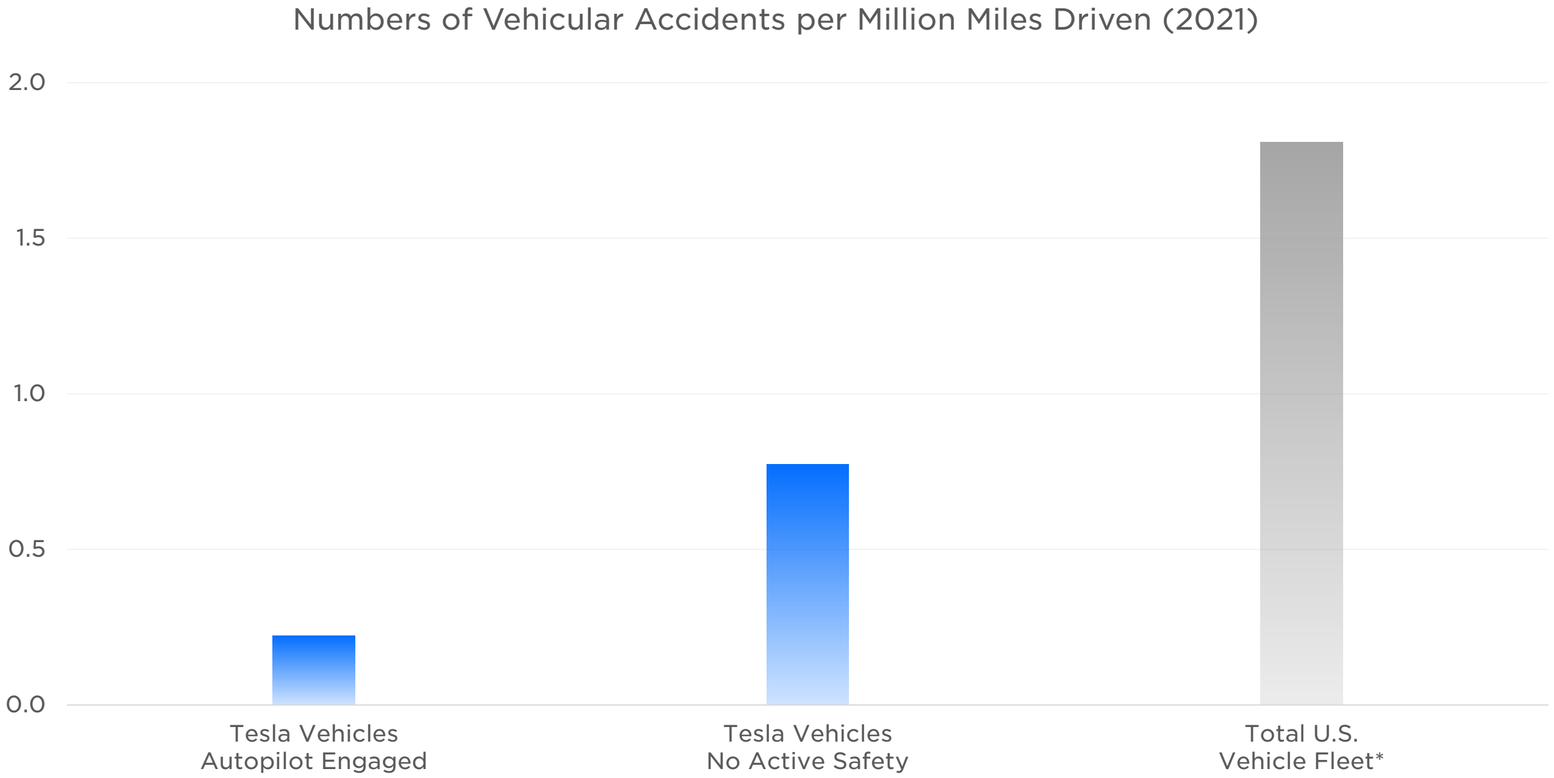


*2019 Safety Assist ratings

Vehicle Safety
Autopilot Safety

Tesla vehicles are engineered for safety and when Autopilot is engaged safety is enhanced

In 2021, we recorded 0.22 crashes for every million miles driven in which drivers were using Autopilot technology (Autosteer and active safety features). For drivers who were not using Autopilot technology (no Autosteer and active safety features), we recorded 0.77 crashes for every million miles driven. By comparison, NHTSA's most recent data shows that in the United States there are 1.81 automobile crashes for every million miles driven.



For the latest quarterly accident data related to our vehicles and a description of our methodology used to collect accident data, please view our Vehicle Safety Report.

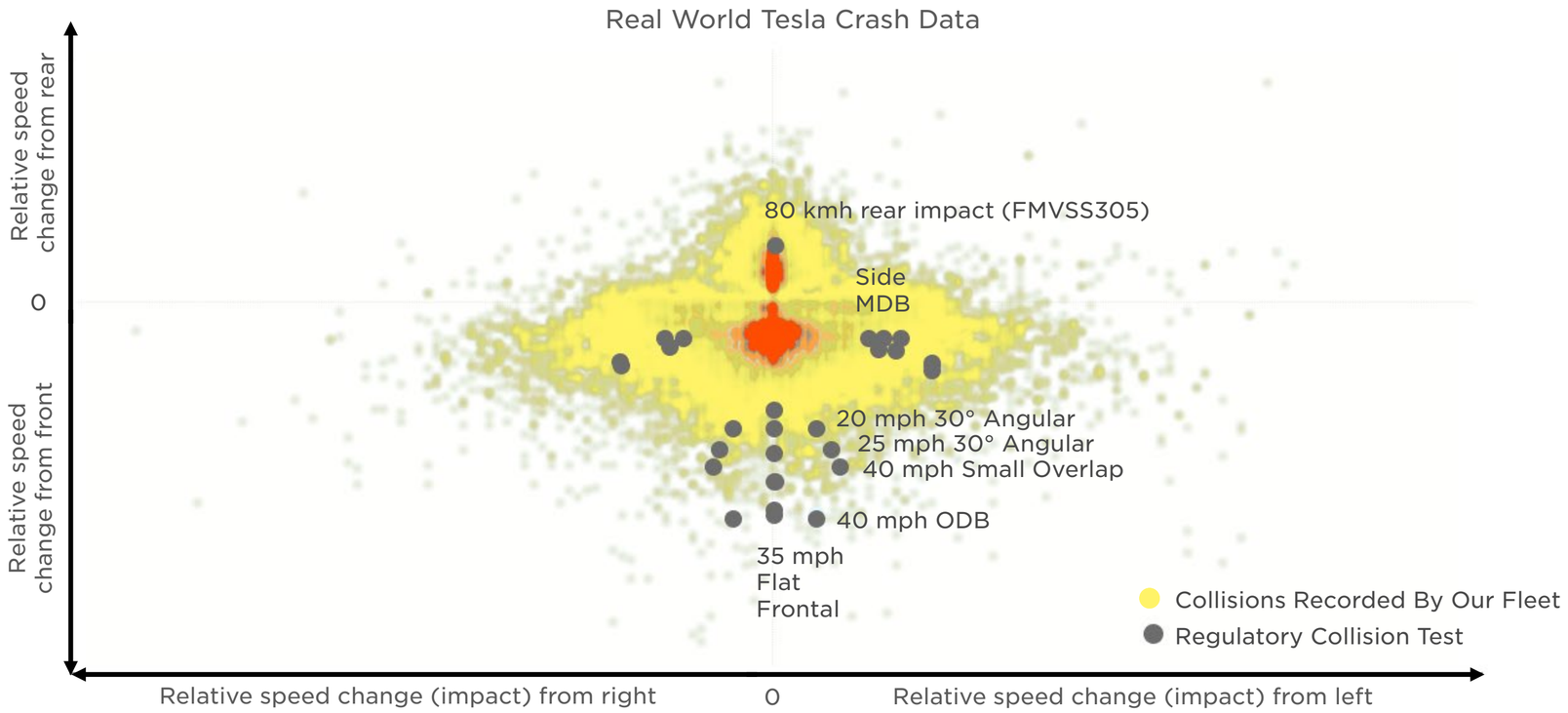
*Based on NHTSA's most recent crash data.

Vehicle Safety
Data-Driven Pre-Crash Safety

Tesla strives to go beyond industry standard testing by using real-world data from our fleet of over two millions cars on the road. Historically, the aim of manufacturers has been to design their vehicles to perform well for a suite of regulatory and consumer tests. There are too many common impact scenarios (visible in the heatmap below) that are simply not covered by regulatory crash tests. The richness of data we are collecting enables us to develop safety in all scenarios, not only the ones covered by regulation and ratings.

Algorithm, Trained By Fleet, Triggers Optimal Safety Responses

We analyze data from our fleet to find solutions, which we then update via over-the-air software updates. Our algorithm uses vehicle sensor data and, within tens of milli-seconds of impact, determines what type of impact has occurred and triggers the seatbelt pretensioners and airbags to respond in the most optimal way down to the millimeter and mile per hour. Tesla engineers are also in the final stages of evaluating a system which uses Autopilot to identify when a crash is imminent. This gives Tesla vehicles an uncanny ability to predict potential collisions and respond faster to an impact when it does occur.



Changing How Vehicles Are Designed For Safety

We use field data, data analytics and simulations to inform our design and safety engineers' work on future products and to send software improvements to our existing fleet via over-the-air updates. Tesla is also sharing data and statistics collected by our vehicles with select regulatory bodies and external research organizations — in an anonymized fashion or with consent and in accordance with local data privacy laws — giving them access to an unprecedented opportunity to understand crashes in the real world. This access to data will accelerate impact safety research, driving change across the safety industry and improved safety outcomes for all vehicles to protect lives.

Post-Crash Data Analysis

After we send new software to the fleet, we wait for new data to come through to understand the efficacy of the system once it is deployed in the real world. Since deployment of our 'offzone' side algorithm (data-driven safety), we learned that of the total vehicles that had their airbags deployed, 15% of those deployed due to our new algorithm in these new modes. This confirms our expectations and highlights how effective fleet-based learnings and rapid deployment of novel solutions can be.

Why Airbags Sometimes Don't Deploy

In a fairly common "small overlap" collision as the one shown below, front sensors are unlikely to pick up a side collision, as they are usually designed to detect a frontal collision. And side sensors are usually too close to a driver window to detect a collision far in the front. We designed our sensors and their positions in a way that they can pick up nearly every type of collision and deploy airbags if necessary.

Watch video on Data-Driven Safety

Restraints Deployments Since Introducing Data-Driven Algorithm

Vehicle Safety
Passive Safety/Collision

Safety starts with our clean sheet design

Improving occupant safety has always been key to our mission. All our vehicles are built off a safety-first architecture with a low center of gravity (thanks to the positioning of our battery) and enhanced frontal impact safety (thanks to the front trunk that is void of the engine found in forward engine ICE vehicles).

Added benefit of enhanced performance

Based on the advanced architecture of Model S and Model X, we engineered Model 3 and Model Y to be some of the safest cars built to date, anywhere. Even though Model 3 and Model Y have no engine, their performance is similar to a “mid-engine internal combustion car” due to a centered battery pack and the fact that the rear motor is placed slightly in front of the rear axle rather than behind it. Not only does this architecture add to the overall agility and handling of the car, but it also improves stability control effectiveness by minimizing rotational kinetic energy.

Model 3 and Model Y score 5-stars in all USNCAP categories

After putting Model 3 and Model Y through a series of crash tests used as part of the New Car Assessment Program to calculate the likelihood of serious bodily injury for front, side and rollover crashes, the National Highway Traffic Safety Administration (NHTSA) awarded each top safety ratings of 5-stars in every category and subcategory.

Over-the-Air Updates

Tesla has pioneered the state-of-the-art way of improving a vehicle’s safety over time

A hallmark of Tesla ownership is connectivity. We are an industry leader in deploying over-the-air (OTA) software updates to our vehicles. These updates are integral to – and continuously enhance – the customer experience, and they can include improvements to customer safety or a remedy to a recall. OTA updates can be installed at a customer’s convenience without a trip to a Tesla Service Center.

Vehicle Safety
Safety Awards

Since 2019, Tesla vehicles earned 5-star ratings from safety rating agencies across the U.S., Europe and Australia. Furthermore, all of Tesla's safety features come standard with every vehicle and our ratings are based on our standard safety equipment. At Tesla, we do not believe that safety should be optional.

	NHTSA 5-Star Safety Ratings More Stars. Safer Cars.	IIHS HLDI	EURO NCAP FOR SAFER CARS	ANCAP SAFETY	C-IASI 中国保险汽车安全指数 CHINA INSURANCE AUTOMOTIVE SAFETY INDEX
Model 3	★★★★★	2022 IIHS TOP SAFETY PICK+	★★★★★	★★★★★	Top rating for occupant safety and active safety
Model Y	★★★★★	2022 IIHS TOP SAFETY PICK+	Scheduled for 2022	Scheduled for 2022	Top rating for occupant safety, pedestrian safety and active safety

Fire incidents are ~11x lower for Tesla vehicles than the average vehicle in the U.S.

When the media reports a story about a vehicle fire, it is usually reporting on an EV fire. This is likely a result of chasing clicks, rather than the prevalence of EV-related fires compared to ICE vehicle-related fires. The reality is, when compared to Tesla vehicles, ICE vehicles catch fire at a vastly higher rate. According to the latest available data, in 2020, there were almost 173,000 vehicle fires in the U.S. alone.

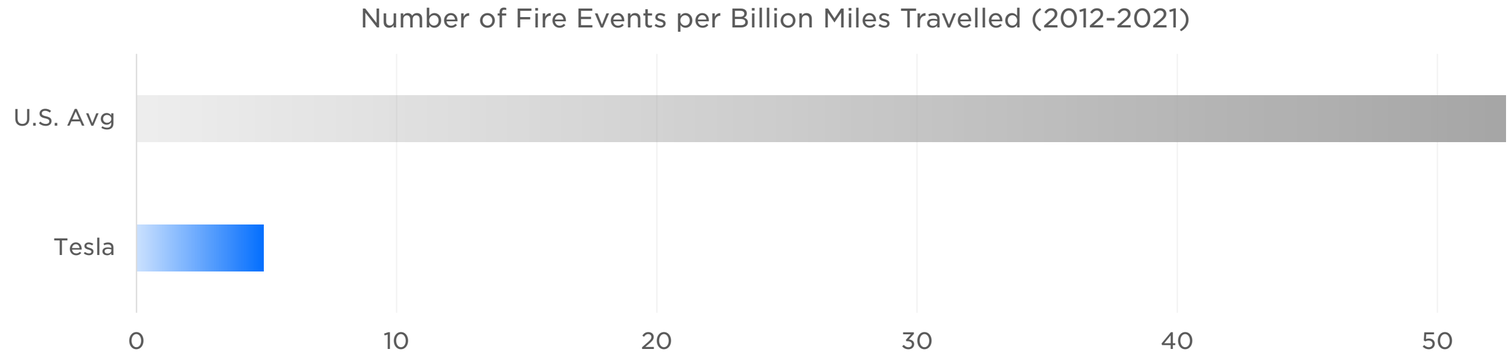
From 2012 to 2021, there has been approximately five Tesla vehicle fires for every billion miles traveled. By comparison, data from the National Fire Protection Association (NFPA) and U.S. Department of Transportation show that in the U.S. there are 53 vehicle fires for every billion miles travelled.

In order to provide an apt comparison to NFPA data, Tesla's data set includes instances of vehicle fires caused by structure fires, arson and other reasons unrelated to the vehicle, which account for some of the Tesla vehicle fires over this time period.

We continue to improve safety

We continue to improve our battery chemistry, cell structure, battery pack structure and vehicle passive safety in order to decrease fire risk to as close to zero as possible. As Tesla's vehicle technology continues to improve, fires will be even less likely for our EVs.

Tesla has partnered with European and Australasian NCAPs to provide free mobile app-based emergency response documentation for quick access to Tesla vehicle specific models. We make detailed information available to first responders so they can safely handle those emergency situations.

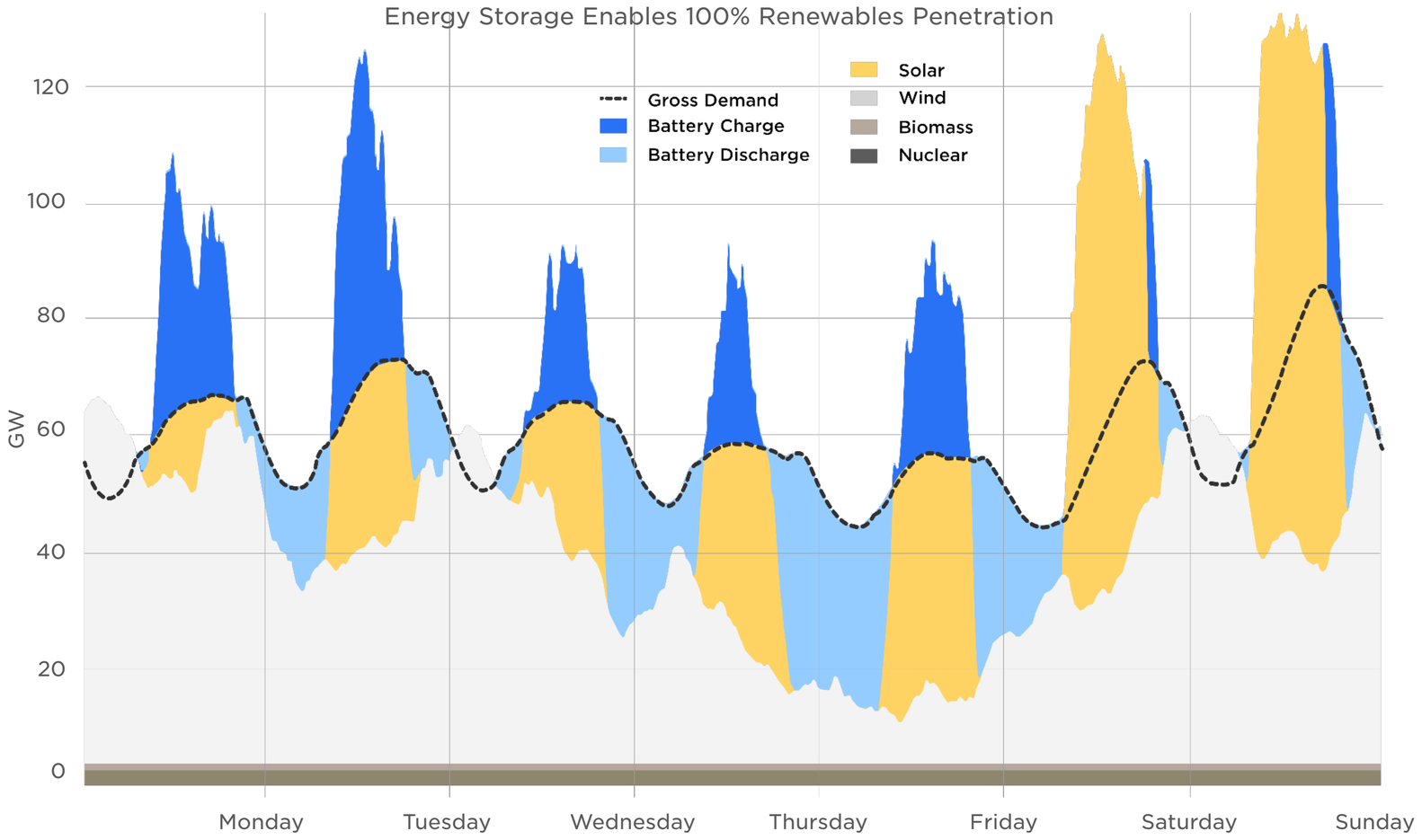


For the latest fire data related to our vehicles, please view our Vehicle Safety Report.

Solar + Storage Product
Matching Energy Demand & Supply

Commercial scale customers: Megapack and renewables

The beauty of selling commercial storage systems such as Megapack is that purchasing such a product is almost purely a mathematical decision for our commercial customers. If installing Megapack makes economic sense, there is no reason not to install one. A single Megapack has on average 3,000 kWh worth of battery storage capacity, and given its scalability, enables projects over 1,000,000 kWh. Tesla Energy continues to be dependent on the global supply chain, including cell supply. In 2021, in order to meet demand that is well in excess of supply for energy storage products, Tesla began building a new production facility capable of producing 40,000,000 kWh of energy storage per year.



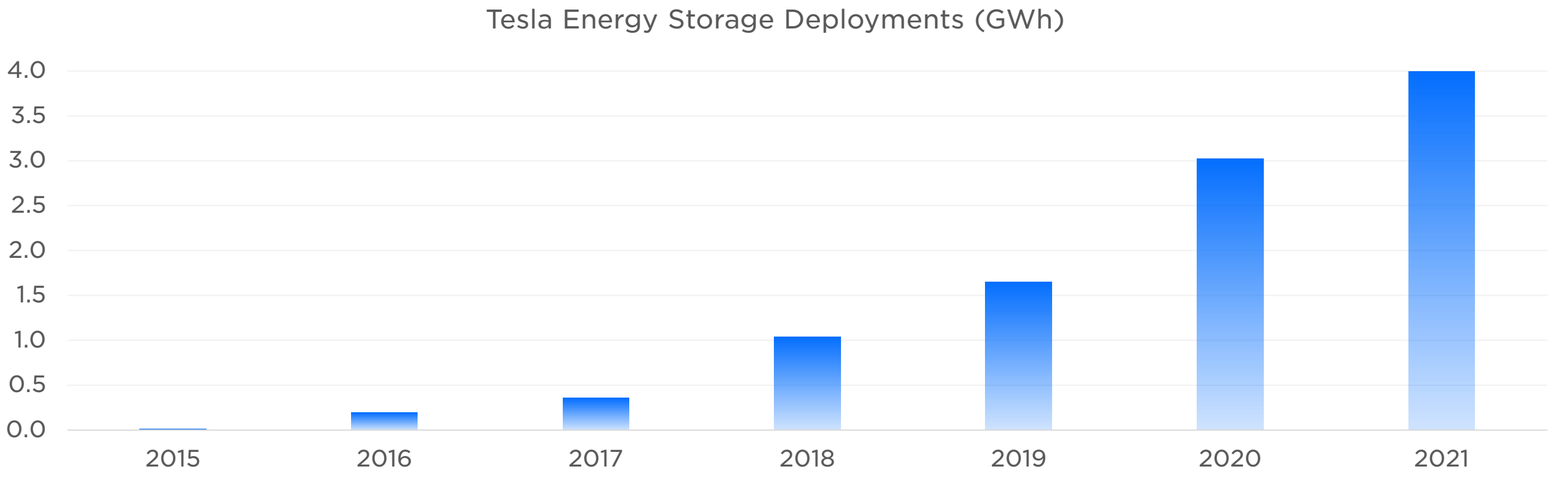
Solar + Storage Product
Potential For Growth

Pairing energy storage with renewables enables cost-effective decarbonization of the grid

The best way to avoid blackouts is to reduce your reliance on the grid. Tesla is a one-stop shop for taking our customers off-grid by covering a large variety of their needs. In 2021, Tesla sold 4 GWh worth of energy storage products, more than 15% of the 25 GWh global market*. Some of these projects were massive deployments, including a 371 MWh installation in California and a 497 MWh installation in Victoria, Australia. In order to switch global energy usage to renewable sources, we estimate that global annual battery storage production will need to increase to ~10,000 GWh.

Residential customers: Solar Roof, solar panels and Powerwall

Anyone can dramatically reduce their carbon footprint by installing Solar Roof or solar panels with Powerwall. In theory, all U.S. domestic electricity needs, as well as vehicle transportation needs, could be met by sunlight alone. Naturally, installation of such a system needs to make financial sense for the customer. In Massachusetts, for example, we estimate that an average solar and storage system pays for itself with energy cost savings within approximately 10 years. As the cost of these products continues to decline, more customers will be willing to switch to solar and storage purely due to lower overall cost.



*Source: S&P Global

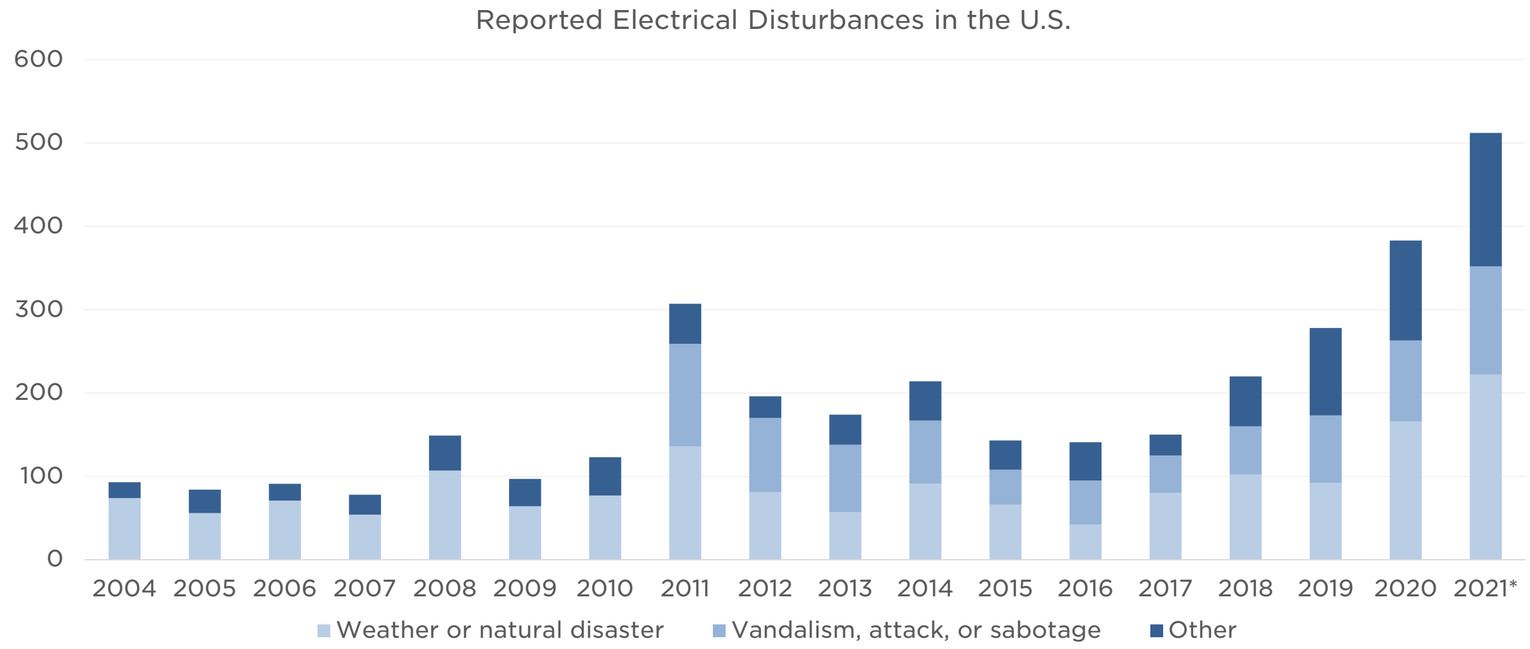
Solar + Storage Product
Improving Resilience Of The Grid

Grid outages are becoming more common

Electrical disturbances in the U.S. are becoming more common, predominantly due to weather and natural disasters. According to the U.S. Department of Energy, electrical disturbances cost businesses $150 billion per year. It is not surprising that homeowners and businesses are increasingly turning to backup power supply options. Our solar and energy storage products are a great way to reduce emissions while also ensuring backup power during outages.

Low cost is key to mass adoption

We are continuously working on reducing the cost of our products in order to foster mass adoption. Ultimately, using renewable energy (such as solar or wind) with battery storage will become the cheapest energy option available, regardless of location. This is already the case in many, but not all, locations around the world. As the cost continues to decline, more customers will be able to financially benefit from turning to renewable energy.



Source: U.S. Department Of Energy, Pew Charitable Trusts

[1] Includes cases of suspicious activity.

[2] Other includes all disturbances that are not clearly identified as weather, natural disaster, vandalism, attack or sabotage.

*Full year figure is a Tesla estimate calculated using data from the first six months of 2021 extrapolated based on historical trends.

Supply Chain

What do we see as impact?

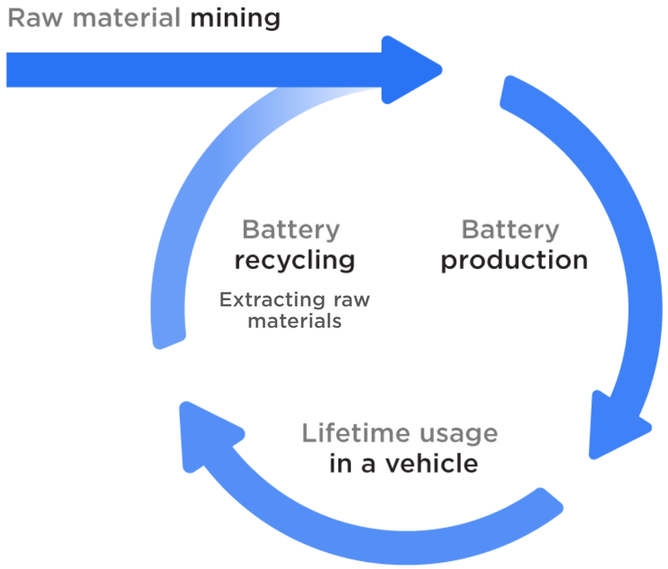
Protecting human rights and the environment is core to our procurement strategy. Tesla creates our products from many different materials and components, some of which we purchase from our direct (Tier 1) suppliers. Many of our Tier 1 suppliers do not purchase all their raw materials directly, rather they get them from their suppliers and sub-suppliers around the world through a complex supply chain. Though we believe that battery recycling will play a critical role in supplying a portion of these materials to enable a closed loop supply chain, we recognize that global battery cell production will continue to rely heavily on primary, mined materials to meet the growing demand for our products.

In line with our mission to accelerate the world's transition to sustainable energy, Tesla is committed to ensuring that companies in our supply chain respect human rights and protect the environment. Our goal is that where Tesla's supply chain touches, local conditions for stakeholders continuously improve as a result of our purchases. Our responsible sourcing strategy has the following objectives:

1. Increase the share of materials we source directly from suppliers, and those closer to our factories (supply chain localization); and
2. Continue to source globally, to contribute to the improvement of local conditions in our sourcing communities.

Mapping GHG emissions in the battery supply chain is one of our top priorities

Upstream GHG emissions from manufacturing an EV battery – from raw material extraction through refining and transportation of materials – can be meaningful. We estimate that these specific activities cause up to ~80% of the total emissions of a Model 3 battery pack, with the largest contributors at the chemical processing stage. Our battery supply chain GHG emissions hotspot analysis – an industry first – is on page 104 of this report.



A common question we receive is: “What happens to Tesla battery packs once they reach the end of their life?” An important distinction between fossil fuels and lithium-ion batteries as an energy source is that while fossil fuels are extracted and used once, the materials in a lithium-ion battery are recyclable. When petroleum is pumped out of the ground, chemically refined and then burned, it releases toxic emissions into the atmosphere that are not recoverable for reuse. Battery materials, in contrast, are refined and put into a cell and will remain in the cell at the end of their life when they can be recycled to recover valuable materials for reuse, repeatedly.

Longer battery longevity is the most sustainable option

Battery pack life extension is the superior option to recycling for both environmental and business reasons. Before decommissioning and recycling a consumer battery pack, Tesla does everything it can to extend the useful life of each pack, including sending out over-the-air software updates to Tesla vehicles to improve battery efficiency when our engineers find new ways to do so. In addition, any battery that is no longer meeting a customer’s needs can be serviced at a Tesla Service Center.

Every battery used in R&D or returned from the field that cannot be re-manufactured is recycled

Tesla batteries, including the battery packs in our vehicles and our energy storage products, are made to last many years, and therefore, we have received a limited number of them back from the field. Most batteries that Tesla recycles today are pre-consumer, coming to us through R&D and quality control. None of our scrapped lithium-ion batteries go to landfills and 100% are recycled. Furthermore, Tesla has an established internal ecosystem to re-manufacture batteries coming from the field to our Service Centers. We actively implement circular economy principles and consider all other options before opting for battery recycling.

The small number of post-consumer batteries that we receive are primarily generated from our fleet of vehicles on the road, predominantly from taxi-like vehicles. Since we have only been producing Model S (our oldest model) for approximately ten years, and our energy storage products for even less time, it will likely be some time before we start receiving back vehicle batteries in larger volumes.

Supply Chain

Recycling

Global annual amount of lithium-ion battery metals sent for recycling

1,500
Tons of Nickel

300
Tons of Copper

200
Tons of Cobalt

A closed-loop battery recycling process presents a compelling solution to move energy supply away from the fossil-fuel based practice of take, make and burn, to a more circular model of recycling end-of-life batteries for reuse over and over again.

While Tesla works with third-party recyclers, we also recycle in-house

In 2020, Tesla successfully installed the first phase of our cell recycling facility at Gigafactory Nevada for in-house processing of both battery manufacturing scrap and end-of-life batteries. While Tesla has worked for years with third-party battery recyclers to ensure our batteries do not end up in a landfill, we understand the importance of also building recycling capacity in-house to supplement these relationships. On-site recycling brings us one step closer to closing the loop on materials generation, allowing for raw material transfer straight to our nickel and cobalt suppliers. The facility unlocks the cycle of innovation for battery recycling at scale, allowing Tesla to rapidly improve current designs through operational learnings and to perform process testing of R&D products. By the end of 2021, this facility achieved a production rate of over 50 tons of recycled material per week.

Every Tesla battery factory will recycle batteries on-site

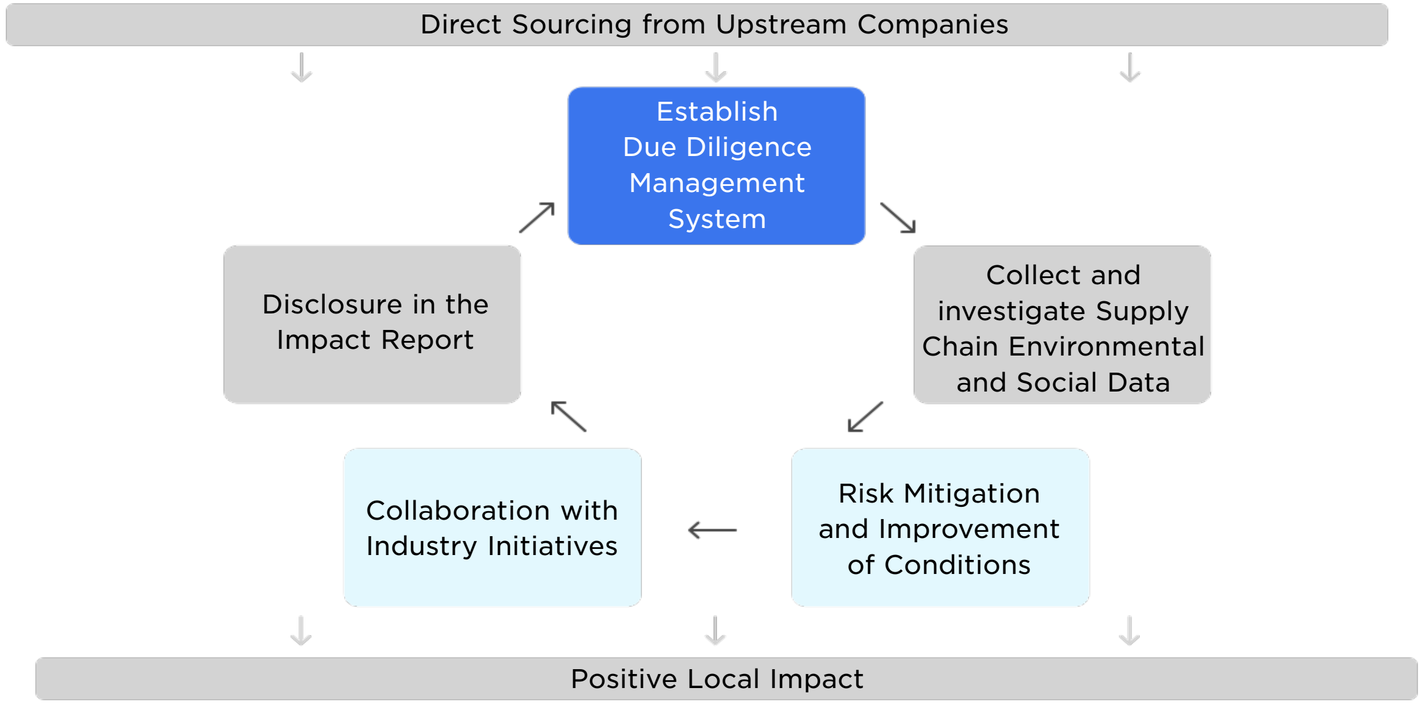
As the manufacturer of our in-house cell program, we are best positioned to recycle our products efficiently to maximize key battery material recovery. With the implementation of in-house cell manufacturing at Gigafactory Berlin-Brandenburg and Gigafactory Texas, we expect substantial increases in manufacturing scrap globally. We intend to tailor recycling solutions to each location and thereby re-introduce valuable materials back into our manufacturing process. Our goal is to develop a safe recycling process with high recovery rates, low costs and low environmental impact. From an economic perspective, we expect to recognize significant savings over the long term as the costs associated with large-scale battery material recovery and recycling will be far lower than purchasing additional raw materials for cell manufacturing.

We have high expectations for our suppliers

Tesla is committed to ensuring that our suppliers operate responsibly. We do this by proactively identifying and addressing potential risks in our supply chains. The Tesla Supplier Code of Conduct, Human Rights Policy and Responsible Materials Policy outline Tesla's expectations for suppliers.

We established a responsible sourcing program based on international best practices

Our responsible sourcing program is based on the OECD Due Diligence Guidance for Responsible Mineral Supply Chains. Tesla collects data from its supply chain (including through audits), translates this data into on-the-ground actions and discloses the outcomes in our annual Impact Report.



The next sections will detail how we undertake each of the five steps laid out above, starting with our management system approach.

Prioritization of cobalt, lithium and nickel

Given their unique significance to the success of EVs and energy storage, Tesla has a dedicated responsible sourcing program for three priority minerals in the battery supply chain: cobalt, nickel and lithium. We prioritize these raw materials for the following reasons:

1. Commercial importance: Cobalt, lithium and nickel are the key raw materials used in cathode production, represent about a third of the total costs of a battery cell and play an essential function in improving vehicle range and safety performance.

2. Potential environmental and social impact and scrutiny: Cobalt, lithium and nickel are also ‘minerals’ – in that they are raw materials that are produced through different methods of mining around the world, often concentrated in countries that face socio-economic and environmental challenges. As known global reserves are depleted, these minerals are becoming increasingly scarce, and companies look to access resources in more remote and challenging locations to meet global demand. Cobalt, lithium and nickel are also classified as critical minerals by the United States, European Union and Canadian governments because they are essential in enabling a transition away from fossil fuels to a low-carbon economy. As a result, the impact of mining activity on the environment and local communities lends itself to greater environmental and social scrutiny from civil society, policymakers and investors.

Mining has an important role to play in the transition to sustainable energy and we engage with suppliers to ensure mining is done in a responsible way. This is one of the reasons Tesla joined the Initiative for Responsible Mining Assurance (IRMA) and uses the IRMA Standard as well as other internationally recognized responsible mining standards in our due diligence.

>95%
Lithium hydroxide sourced directly

>50%
Cobalt sourced directly

>30%
Nickel sourced directly

The unique Tesla approach: Going directly to the source

The implementation of an OECD-aligned approach for cobalt, nickel and lithium is underpinned by the following two pillars:

1. Direct sourcing from mining companies: While cobalt, nickel and lithium go through multiple processing steps by different companies, some of the more important environmental and social risks in this supply chain are present at mine sites. Direct sourcing from mining companies allows Tesla to engage directly in local contexts instead of having to rely on multiple midstream companies that typically sit between EV makers and mining. It also enables more transparent and traceable supply chains and better environmental and social data. In 2021, Tesla procured >95% of lithium hydroxide, >50% of cobalt and >30% of nickel for nickel-containing (NCA and NCM) cells directly from nine mining and chemicals companies. All nine binding contracts include environmental and social requirements. As Tesla's battery supply chain continues to scale, Tesla expects the proportion of directly sourced minerals to increase.

2. Direct local engagement: Building on direct supplier engagement, Tesla seeks to contribute to the continuous improvement of conditions in communities affected by operations in Tesla's supply chain, informed by engagement with local experts, community organizations and civil society.

Our diversified cathode strategy

Tesla's batteries today contain a variety of different cathode chemistries, including nickel-cobalt-aluminum (NCA) and nickel-cobalt-manganese (NCM) for higher energy applications and lithium iron phosphate (LFP) for lower energy applications. Tesla will continue to advance a diversified cathode strategy for LFP, nickel-rich and manganese-rich cathodes to address various market segments for vehicle and energy storage products and provide future flexibility based on raw materials availability and pricing. To put this into context, lithium only accounts for roughly 1.5% of the full battery pack weight. Additionally, iron phosphate battery packs contain no cobalt or nickel.

While the relative cathode compositions and our overall demand of various minerals and battery-grade chemicals will continue to evolve, Tesla and the global battery supply chain will require significant quantities of responsibly produced lithium, nickel, cobalt, manganese, iron, phosphates and many other minerals for the foreseeable future. While we recognize the critical role battery recycling will play in supplying a portion of these materials to enable a closed loop supply chain, global cell production will continue to rely heavily on primary, mined materials to meet the growing demand in the short to medium term. The availability and affordability of these minerals and chemicals are key to advancing Tesla's mission and accelerating the transition to sustainable energy. We will continue to collaborate with our suppliers and upstream producers in providing visibility to enable the scale up of key battery minerals.

For cells containing NCA and NCM cathodes, we continue to work toward batteries that contain higher levels of nickel in order to improve vehicle range while lowering overall battery costs, without compromising overall cell performance, such as battery safety and lifetime, that is currently enabled by cobalt. It is important to note that we expect our absolute cobalt demand to increase over the coming years because our vehicle and cell production growth rate is forecasted to outpace the overall rate of cobalt reduction on a per cell basis.

Nickel-Cobalt-Aluminum Cathode

Nickel-Manganese-Cobalt Cathode

Lithium-Iron-Phosphate Cathode

Battery Supply Chain
#2 Risk Identification

100%

Refiners and mine sites in Tesla's cobalt, nickel and lithium supply chains that we directly sourced from underwent or have committed to undergo independent third-party sustainability audits

83%

Of all refiners and mine sites in Tesla's cobalt, nickel and lithium supply chains underwent, or have committed to undergo, independent third-party sustainability audits

Collect and review environmental and social data to identify risks

In the past year, Tesla collected environmental and social data in its cobalt, lithium and nickel supply chains through the following main activities:

2.1 Audits

Audits are an important tool for Tesla to gather environmental and social data for cobalt, nickel and lithium.

- In 2021, 83% of refiners and mine sites in Tesla's supply chain, including 100% of refiners and mine sites from whom Tesla sources directly, either underwent or committed to undergo independent external sustainability audits against one of the following sustainability and responsible mining standards: IRMA Standard, the Responsible Minerals Initiative (RMI) Responsible Minerals Assurance Process (RMAP), Towards Sustainable Mining (TSM) and/or the International Council on Mining and Metals (ICMM) Performance Expectations.
- In addition, Tesla conducted six audits in the battery supply chain tailored to Tesla's specific environmental and social requirements, including the OECD guidance and environmental management systems. Tesla also has an audit program that goes beyond the battery supply chain – please see pages 112 - 115.
- Tesla also reviews suppliers' ISO14001 (environmental management) and OHSAS 18001 (occupational health and safety) certification statuses.

2.2 Continued supply chain mapping

Tesla used a newly developed Know-Your-Supplier (KYS) Questionnaire to map our battery supply chain and collect information related to suppliers' environmental and social management systems.

The table below lists all our direct supplier relationships in the battery supply chain.

Supplier	Material	Country	Type	Independent External Sustainability Assessment[1]	Life-Cycle Analysis (LCA) Completed[2]
Albemarle	Lithium	Australia (mine); China (refinery)	Integrated Mine Site + Refiner		
Livent	Lithium	Argentina (mine); China, USA (refinery)	Integrated Mine Site + Refiner		
Ganfeng	Lithium	China	Refiner	N/A[3]	
Yahua	Lithium	China	Refiner	N/A[3]	
Guizhou CNGR	Cobalt, Nickel	China	Refiner		
Hunan CNGR	Cobalt, Nickel	China	Refiner		
Huayou	Cobalt, Nickel	China	Refiner		
Glencore Kamoto Copper Company	Cobalt	Democratic Republic of Congo (DRC)	Mine site		
Glencore Murrin Murrin	Nickel	Australia	Integrated Mine Site + Refiner		
BHP Nickel West	Nickel	Australia	Integrated Mine Site + Refiner		
Prony Resources	Nickel	New Caledonia	Mine site		
Vale	Nickel	Canada	Integrated Mine Site + Refiner		

Legend

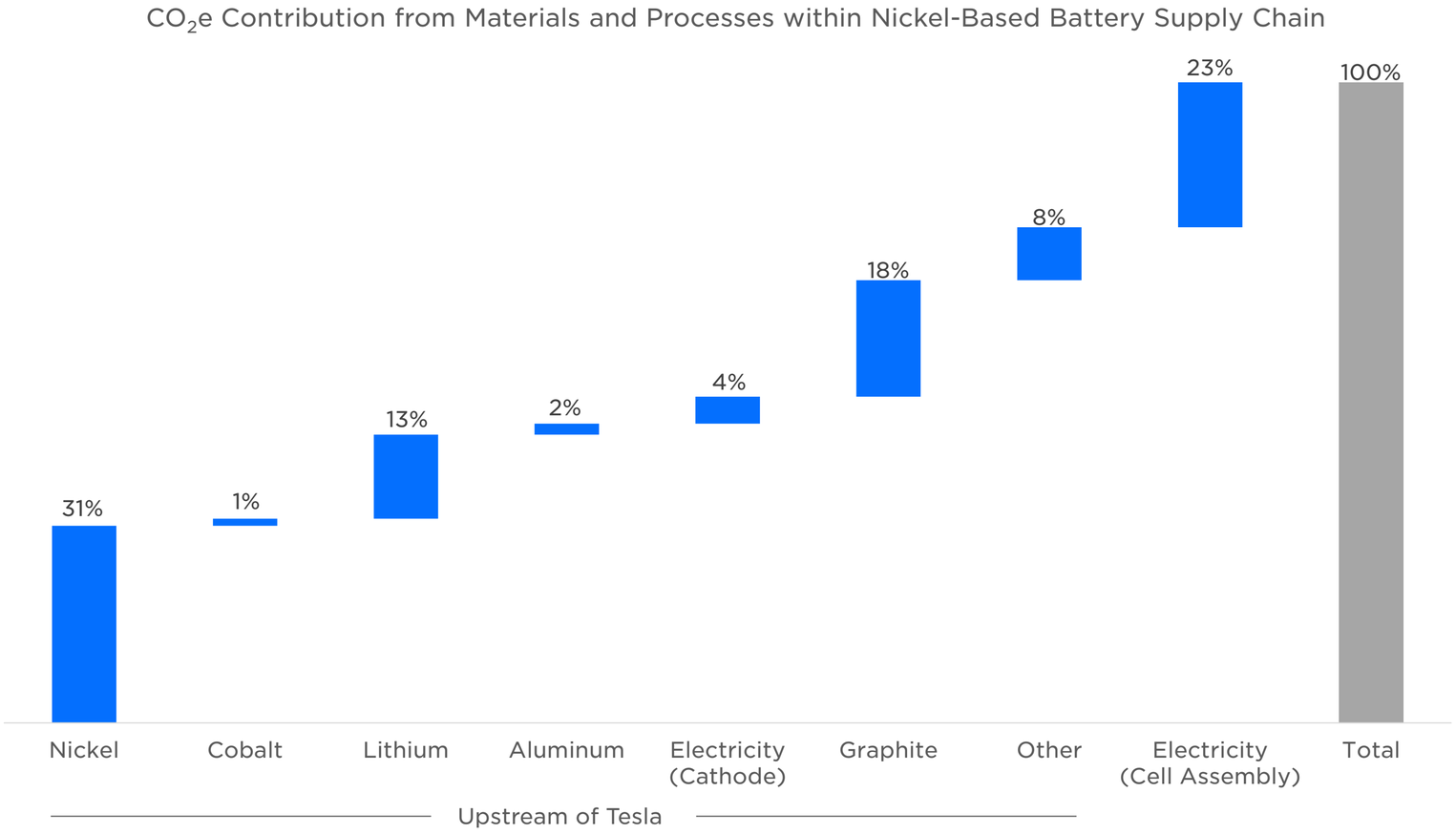
	Completed
	In progress / planned / commitment made
	No commitment / undisclosed

[1] Independent external sustainability assessments included: Initiative for Responsible Mining Assurance (IRMA), the Responsible Minerals Initiative (RMI) Responsible Minerals Assurance Process (RMAP), and/or the International Council on Mining and Metals (ICMM) Performance Expectations, Towards Sustainable Mining (TSM)
[2] This column refers to LCAs conducted by the supplier (not Tesla).
[3] There is currently no industry-wide 3rd party audit program for lithium refiners.

2.3 GHG emissions hotspot identification

In addition to the product-specific LCA described in the Environmental Impact section, Tesla also commissioned LCA service provider Minviro to identify hotspots with high global warming potential across eight specific processing routes from which we currently source cobalt, nickel and lithium.

The hotspot analysis found that main drivers of GHG emissions depend on the different battery compositions, processing routes and countries of origin. Overall, key drivers are the cathode and anode supply chains. Within the cathode supply chain, the hotspots are nickel and lithium, and cobalt was only a minimal contributor. Within the cobalt, nickel and lithium supply chains, chemical processing (refining / smelting) was a larger driver than mining.

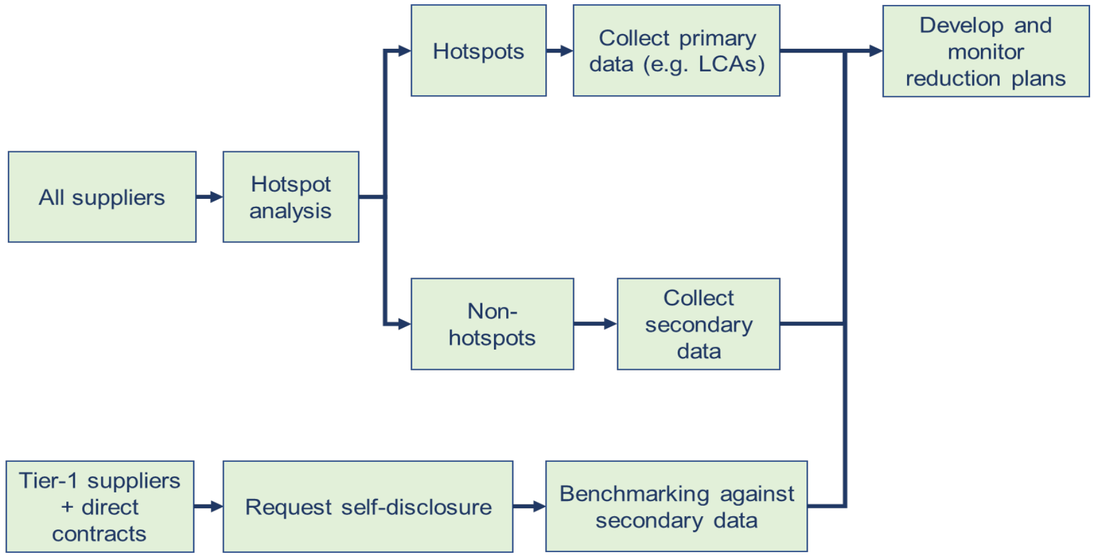


2.3 GHG emissions hotspot identification

Tesla complemented the hotspot analysis with data collected during a pilot blockchain traceability project for nickel sourced from Tesla nickel supplier, BHP, that traced nickel from a mine site in Australia to Tesla and collected GHG emissions data for every step. The pilot project showed that mining and upstream processing had a higher CO_2e intensity than precursor, cathode and battery cell production.

Building on this hotspot analysis and pilot project, Tesla developed a data collection methodology aligned with the GHG Protocol – a globally recognized standard for measuring GHG emissions – and informed by the European Product Environmental Footprint methodology and the Product Environmental Footprint Category Rules (PEFCR) guidance for batteries — a set of rules developed by the European Union on calculating product-specific environmental footprint. Instead of relying on estimates or aggregate data from third parties, Tesla's ambition is to collect as much primary data from Tesla's suppliers as possible to get the most accurate understanding of GHG emissions hotspots and therefore, how to reduce emissions.

Approach to Supply Chain Data Collection for GHG emissions



2.4 Reports from non-governmental organizations (NGOs) and local stakeholders

Reports and grievances from NGOs and community organizations as well as media articles are other important sources for potential environmental and social risk information. Tesla reviews allegations in detail and conducts its own investigations, including through direct bilateral engagement with relevant suppliers and with the parties making the allegations, to assess the severity of the risk and possibilities for risk avoidance or corrective actions.

2.5 Visits to the Democratic Republic of Congo (DRC) and Argentina

A Tesla delegation including members of Tesla's Responsible Sourcing Committee visited suppliers in the DRC and Argentina. Both trips included visits to mine sites and meetings with community representatives. In the DRC, Tesla also visited a school, an orphanage and a maternity clinic. Aside from contributing to Tesla's environmental and social risk assessments, the trips helped Tesla better understand local contexts and challenges. The DRC trip provided a more nuanced view of the complex issue of artisanal and small-scale mining (ASM) and its history within the DRC. In Argentina, the trip focused on questions related to water usage and the use of new technologies to extract lithium in a more energy-efficient way.

From all the activities listed in this section, Tesla identified six risk areas as well as cross-cutting topics in cobalt, lithium and nickel supply chains for prioritized engagement, described in Step 3, on the next page.

Visiting a lithium extraction site in Argentina

Visiting a cobalt mine site in the DRC

Environmental and social risk mitigation and improvement of conditions

As a result of the activities listed in Step 2, Tesla identified the following focus areas for risk mitigation and improvement of local conditions at or around cobalt, nickel and lithium mine sites in Tesla's supply chain:

Priority area	Examples of actions taken by Tesla
Fair working conditions and occupational health and safety	Tesla reviewed • A supplier's occupational health and safety system • A supplier's digital system to monitor the risk of unavoidable landslides • Evidence of progress towards the elimination of safety-related incidents • Minutes from community meetings to raise awareness around safety risks related to landslides and trespassing • A supplier's commitment to conduct a Human Rights Risk and Impact Assessment (HRRIA)
Protecting water levels and water quality in waterways affected by supplier operations	Tesla reviewed • Data on water levels and water quality, including environmental surface water monitoring sheets • Evidence that potential sources for acid leaks were decommissioned or re-engineered • Minutes from community meetings to raise awareness of potential sources of water pollution and mitigation measures • Written assurance that water is not discharged to water sources for nearby communities Tesla also met with community representatives to confirm that a supplier's usage of freshwater does not impact communities' water access. For another supplier, Tesla participated in the establishment of a committee of independent environmental experts to assess and work with the supplier on environmental risk management.
Co-existence between industrial and artisanal mining operations	Tesla reviewed • Evidence for a supplier's government engagement in support of artisanal mine site legalization • Evidence for investments into initiatives supporting responsible artisanal mining Tesla also met with representatives of artisanal mining communities and provided funding to initiatives supporting responsible artisanal mining (see page 109).

Battery Supply Chain
#3 Risk Mitigation and Positive Impact

15
Refiners, smelters and mine sites in Tesla's battery supply chain disclosed they conducted an LCA

55
Corrective actions agreed to with suppliers related to their sustainability management processes

Environmental and social risk mitigation and improvement of conditions

As a result of the activities listed in Step 2, Tesla identified the following focus areas for risk mitigation and improvement of local conditions at or around cobalt, nickel and lithium mine sites in Tesla's supply chain:

Priority area	Examples of actions taken by Tesla
Protection of forests and biodiversity	Tesla reviewed • A supplier's area of operation in relation to nearby forest areas • A supplier's reforestation and rehabilitation plans • Written assurance that mining activities did not take place in rainforest areas • Environmental impact assessments
Community consultation and engagement and protection of indigenous rights	Tesla directly engaged with representatives of communities affected by mining operations to review that regular engagement and consultation take place and community needs are responded to. Tesla also reviewed • Meeting minutes to ensure communities were regularly consulted • Evidence for a best-practice Free, Prior and Informed Consent (FPIC) process, including in coordination with responsible government authorities
GHG emissions reduction and air pollution	Tesla's approach to GHG emissions data collection (see Graph in Step 2) is currently being implemented. The data collected will inform the development of concrete actions to reduce Tesla's Scope 3 emissions. • Based on an initial review, 15 refiners and mine sites in Tesla's supply chain disclosed that they conducted an LCA
Cross-cutting	Across all risk areas identified, Tesla • Reviewed suppliers' audit frameworks to ensure upcoming audits will cover all areas identified above • 55 corrective actions agreed to with suppliers related to suppliers' environmental and social management processes • Expanded environmental and social requirements in supplier contracts, for example related to responsible mining standards, LCAs, GHG emissions footprint disclosure, and transparent and proactive risk disclosure • Developed a formal technical collaboration on sustainability with a supplier