

# Impact Report 2019

T E S L A



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## Introduction

The very purpose of Tesla's existence is to accelerate the world's transition to sustainable energy. In furtherance of this mission, we are excited to publish our second annual Impact Report. Transparency and disclosure are important for our customers, employees, and shareholders, which is why we have expanded the Impact Report's content this year.

While many environmental reports focus on emissions generated by the manufacturing phase of products and future goals for energy consumption, we highlight the totality of the environmental impact of our products today. After all, the vast majority of emissions generated by vehicles today occur in the product-use phase—that is, when consumers are driving their vehicles. We believe that providing information on both sides of the manufacturing and consumer-use equation provides a clearer picture of the environmental impact of Tesla products, and we have done so this year largely through a lifecycle analysis detailed in this report.

Tesla aims to continue to increase the proportion of renewable energy usage at our factories in an effort to minimize the carbon footprint for every mile traveled by our products and their components in our supply chain. All of the factories that we built from the ground-up, such as Gigafactory Nevada and Gigafactory Shanghai, and our forthcoming Gigafactories in Berlin and North America, are designed from the beginning to use energy from renewable sources.

Making a significant and lasting impact on environmental sustainability is difficult to achieve without securing financial sustainability for the long term. We generated positive Free Cash Flow (operating cash flow less capex) of more than \$1 billion for the first time in 2019. We believe the notion that a sustainable future is not economically feasible is no longer valid.



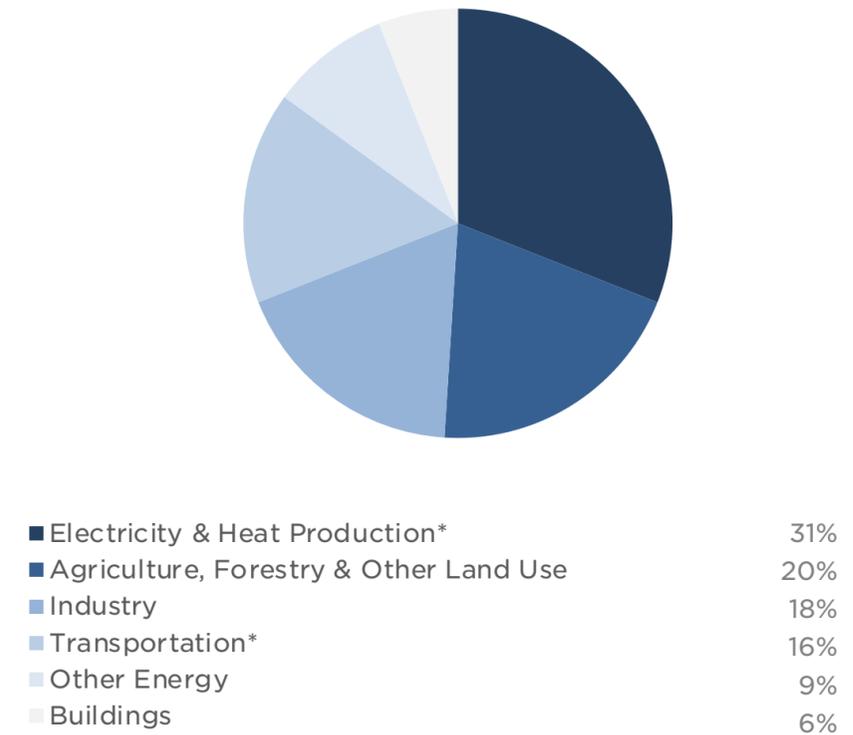
## Mission & Tesla Ecosystem

Climate change is reaching alarming levels in large part due to emissions from burning fossil fuels for transportation and electricity generation. In 2016, carbon dioxide (CO2) concentration levels in the atmosphere exceeded the 400 parts per million threshold on a sustained basis - a level that climate scientists believe will have a catastrophic impact on the environment. Worse, annual global CO2 emissions continue to increase and have approximately doubled over the past 50 years to over 43 gigatons in 2019. The world's current path is unwise and unsustainable.

The world cannot reduce CO2 emissions without addressing both energy generation and consumption. And the world cannot address its energy habits without first directly reducing emissions in the transportation and energy sectors. We are focused on creating a complete energy and transportation ecosystem from solar generation and energy storage to all-electric vehicles that produce zero tailpipe emissions.

Since the onset of shelter-in-place orders and travel restrictions due to COVID-19, we have seen dramatic increases in air quality across the planet, as well as projections for CO2 emissions to drop in excess of 4% in 2020 compared to pre-COVID-19 levels, according to researchers. Because these improvements in air quality and reductions in CO2 are a result of a global economic disruption and not due to systemic changes in how we produce and consume energy, they are not expected to be sustained absent intervention. However, these changes have shown us the positive impacts of reduced pollution in a very short period of time. At Tesla, we believe that we all have an unprecedented opportunity to learn from this disruption and accelerate the deployment of clean energy solutions as part of a recovery for all economies throughout the world, and we will actively continue to advocate for the realization of these long-term changes.

Global Greenhouse Gas (GHG) Emissions by Economic Sector



\*Tesla-related sectors. Source: World Resources Institute

According to the Global Carbon project, when fully tallied, total carbon emissions from 2019 are expected to hit another record high of over 43 gigatons for the year. Energy use through electricity and heat production (31%) and transportation (16%) are significant drivers of these GHG emissions.

## Mission & Tesla Ecosystem

To create an entire sustainable energy ecosystem, Tesla also manufactures a unique set of energy products that enable homeowners, businesses and utilities to produce and manage renewable energy generation, storage and consumption. Homeowners can install solar panels or Solar Roof to power their home using 100% renewable energy and then store that energy in Powerwall, which makes electricity available during peak energy-use periods and at night, while also providing power during grid outages. Meanwhile, depending on their particular requirements and the size of the project, utilities and businesses can purchase Megapack – an infinitely scalable energy storage system that provides greater control, efficiency, and reliability across the electric grid – for their energy storage needs.

Renewable energy generation and storage are critical components of developing microgrids – an increasingly important means of delivering reliable and sustainable electricity around the world. As the deployment of Tesla’s products continues to accelerate, we can scale the adoption of renewable energy, cost-effectively modernize our aging infrastructure (while becoming less reliant on it), and improve the resilience of the electric grid to benefit everyone.



# Environmental Impact



## Introduction



In this section of the Impact Report, we will go through the details and calculations of the lifetime environmental impact of our products.

We are often asked if electric vehicles (EVs) are more sustainable than internal combustion engine (ICE) vehicles. The environmental impact of zero-emission transport and energy products, like the products that Tesla produces and sells, is undeniably more positive than the GHG-emitting alternatives. However, determining the lifetime impact of EVs versus ICE vehicles requires looking at the entire lifecycle - from raw materials to emissions to disposal and not just at the emissions resulting from vehicle usage.

This is not a straightforward task and some of the most common omissions that we have seen in similar studies include the following:

- a) Using Worldwide Harmonized Light Vehicle Test Procedure (WLTP) or Environmental Protection Agency (EPA) fuel/energy consumption data (which overestimate fuel-economy and underestimate emissions), rather than real-world data;
- b) Not taking into account the higher energy efficiency of Tesla's powertrains;
- c) Assuming that the average EV needs a battery replacement at some point in its life;
- d) Not accounting for emissions generated through oil refining and the transportation process; and
- e) Using outdated data for the carbon impact of cell manufacturing.

We tried to address these considerations and complexities in deriving a more accurate calculation in the following lifecycle analysis.

It is important to remember that environmental impact goes beyond just carbon footprint. According to the World Health Organization (WHO), more than four million people die of air pollution every year. The reduction of Nitrogen Oxides (NOx) and other particulates in the air makes our communities healthier places to live, work, and visit and is another core benefit of driving an EV.

In addition, solar panels deployed by Tesla (including SolarCity prior to its 2016 acquisition by Tesla) over the years have generated vastly more electricity than what was required to run our factories and related facilities.

# Lifecycle Analysis of Tesla EVs versus Average ICE Vehicles

## 69 tons

Lifetime CO2 emitted by an average combustion engine vehicle (model year 2019) sold in the U.S. through its use phase, excluding CO2 emitted during the oil refining phase.

On the right and in the following pages we have laid out our lifecycle analysis, which includes the emissions per mile from:

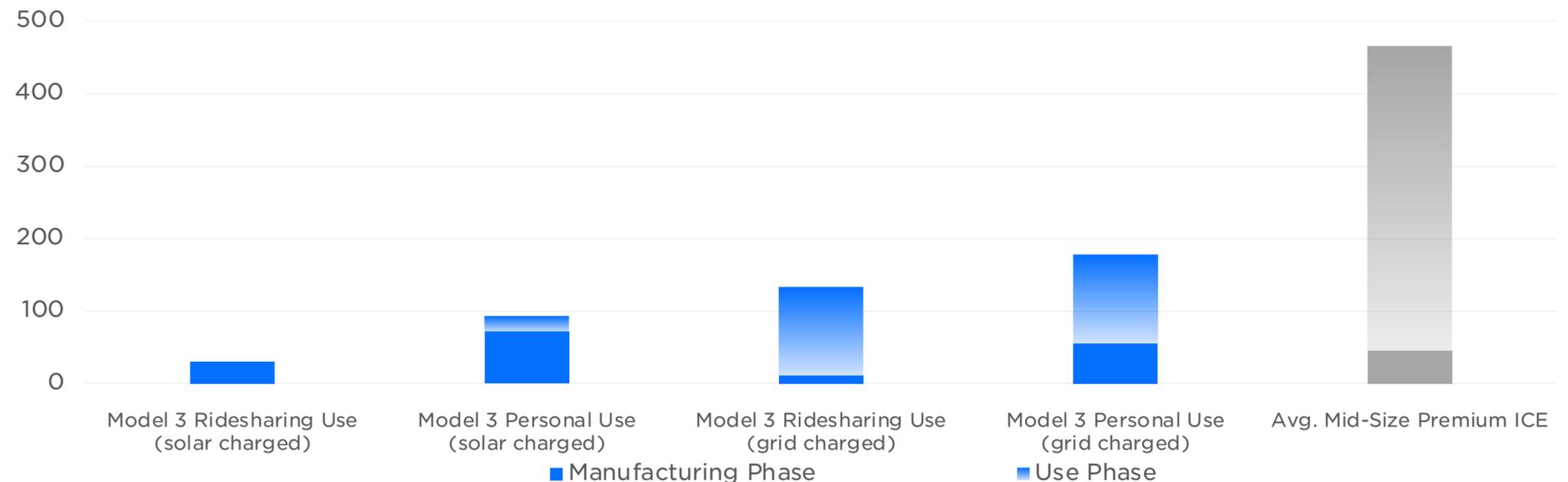
- A current Fremont-made Model 3 charged from a grid with the generation mix that reflects the geographic distribution of Model 3 deliveries in the U.S.
- What emissions per mile could be if the Model 3 were used for ridesharing over one million miles using cell chemistry from our energy products
- What emissions per mile could be if a Model 3 were principally charged at home using a solar system and energy storage
- What emissions per mile could be if a Model 3 were used for ridesharing over one million miles using cell chemistry from our energy products and if it were only charged using a solar system and energy storage
- The reference ICE vehicle is based on the average mid-size premium sedan in the U.S.

The most important variable in a life cycle analysis is real-world fuel consumption or electricity consumption, which impacts the use phase of the lifecycle. Various efficiency testing cycles such as the New European Driving Cycle (NEDC), WLTP, or EPA don't truly represent real-world fuel/energy consumption. This is why, for the purpose of this analysis, we used average energy consumption over the more than 4 billion miles Tesla Model 3s have travelled to date, including energy losses during the charging process. For ICE vehicles, we used real-world fuel consumption data provided by Consumer Reports, according to which mid-size premium sedans for model year 2019 on average achieve 23.6 MPG, and this translates to approximately 420 grams of CO2 per mile, once we account for emissions generated through extraction, refining, and shipment of oil.

Even if we use the official EPA efficiency rating (instead of real-world data) for a Toyota Prius of 56 MPG, which translates to 177 grams of CO2 per mile (incl. refining & transport of oil), an EV would still emit fewer lifetime emissions than the Prius. Regarding mileage and lifespan, we estimate that an average vehicle in the U.S. is driven slightly less than 12,000 miles per year for about 17 years before it is scrapped. Furthermore, as an ICE vehicle ages, its fuel efficiency only remains stable if serviced properly. On the other hand, electricity generation to charge EVs has become "greener" over time with the addition of cleaner energy sources to the grid. Thus, emissions generated through EV charging should continue to decline over time.

It is important to highlight that, for the purpose of this analysis, we assumed no additional renewable energy capacity on the grid during the life of the vehicle given the shape of the renewable energy adoption curve in the U.S. is still very much up for debate. That said, in the following slide we show that a Tesla Model 3 charged in locations with "greener" grids like New York state, for example, have much lower lifecycle emissions than the U.S. average. We believe that cities, states, and countries alike will strive to reduce grid emissions in the future. This dynamic highlights how EVs on the road today will become cleaner as they age and how critical "greening" the grid will be to achieving reduced transportation emissions.

Average Lifecycle Emissions in U.S. (gCO2e/mi)



## Reducing Carbon Footprint Even Further Increasing Proportion of Renewable Energy Sources

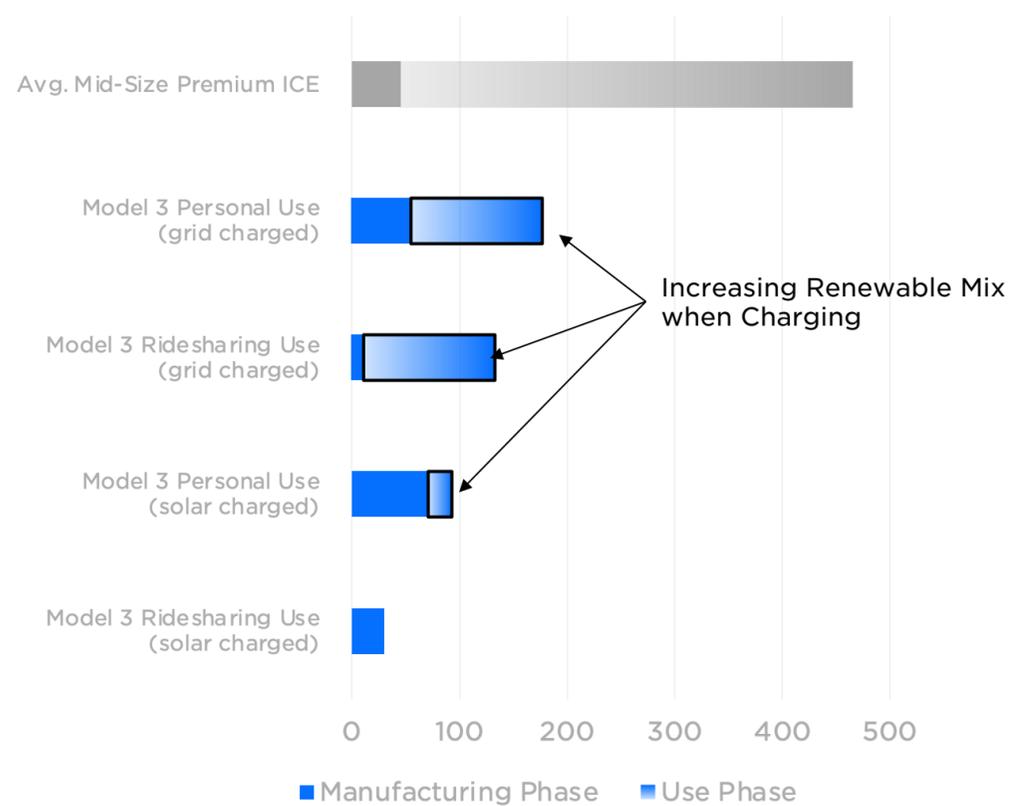
Charging a Model 3 using solar panels and a Powerwall adds emissions to the manufacturing phase while reducing use phase emissions as low as zero when 100% of charging is done using that system. The personal use scenario below assumes 18% of charging is done using the public fast-charging network, based on observed fleet behavior.

While the electricity grid varies from region to region, charging EVs is becoming less carbon intensive every year. In the U.S., coal has historically been the dominant energy source for generating electricity. But in the last decade, coal power has declined significantly as regions turn to cleaner energy sources. Energy generated by renewable sources has grown rapidly, accounting for an estimated 43% of new electricity generation capacity in 2018. Many U.S. states (such as New York referenced in the chart below) have been making significant investments in renewable energy as these sustainable options become more cost competitive compared to fossil fuel resources.

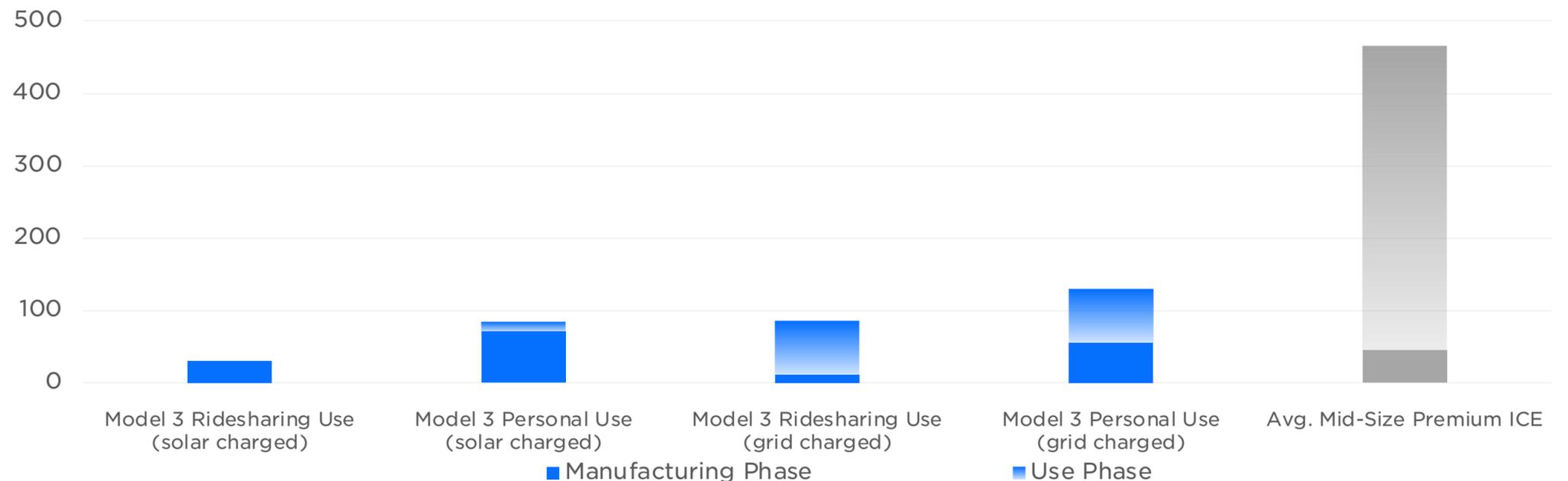
To put this in perspective, average GHG emissions from charging one New York-based Tesla vehicle equates to the emissions from an ICE vehicle with a fuel economy of 144 MPG (no such vehicle is on the market). Even when charging a Tesla in Michigan, where approximately 64% of energy comes from coal and natural gas, the emissions from our vehicles still equates to the equivalent emissions of an ICE vehicle with 55 real-world MPG (considerably more in terms of EPA rated MPG). As more regions adopt sustainable energy solutions to generate power, emissions related to charging an EV from the grid will decrease even further.

EV customers can accelerate the process of increasing their renewable energy mix by installing solar panels or a Solar Roof and an energy storage solution, such as Powerwall, in their homes. Such an effort dramatically reduces the lifetime carbon footprint of an EV, even when accounting for the carbon footprint of both the solar panel/Solar roof and Powerwall manufacturing. Remaining use-phase emissions from solar charged vehicles come from publicly available fast-charging, which too is becoming “greener” every year. Our goal is to strategically pair solar and battery storage at as many Tesla Supercharger stations as is feasible.

Average Lifecycle Emissions in U.S. (gCO<sub>2</sub>e/mi)



Average Lifecycle Emissions in New York State (gCO<sub>2</sub>e/mi)

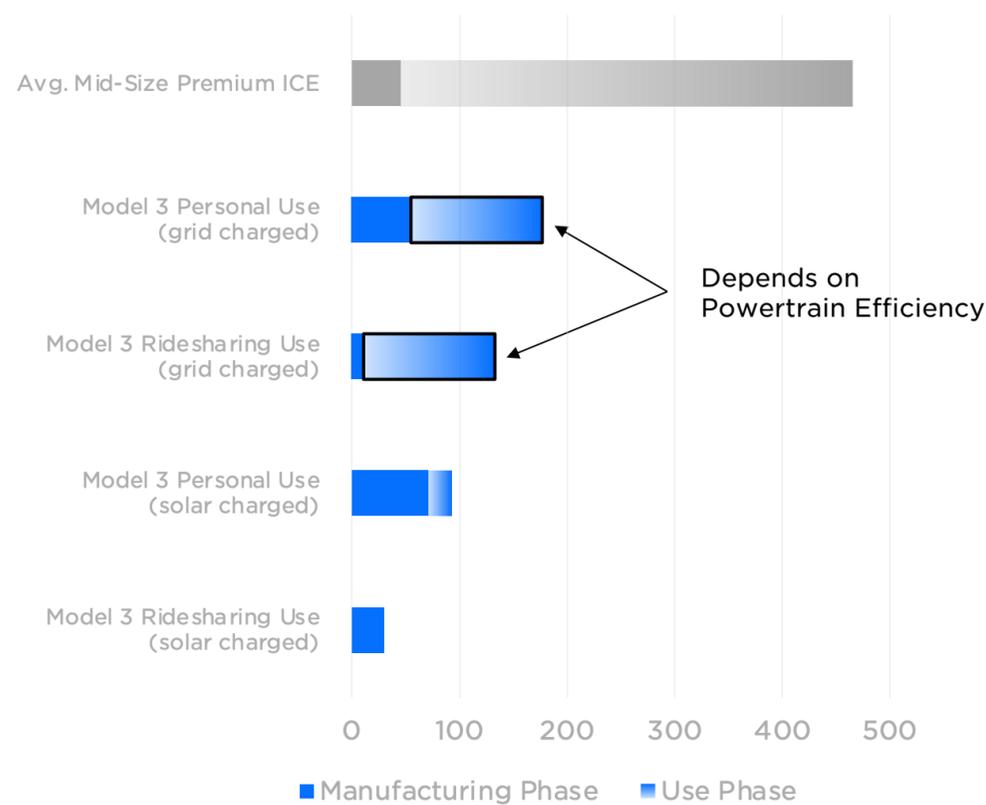


## Reducing Carbon Footprint Even Further Improving Powertrain Efficiency

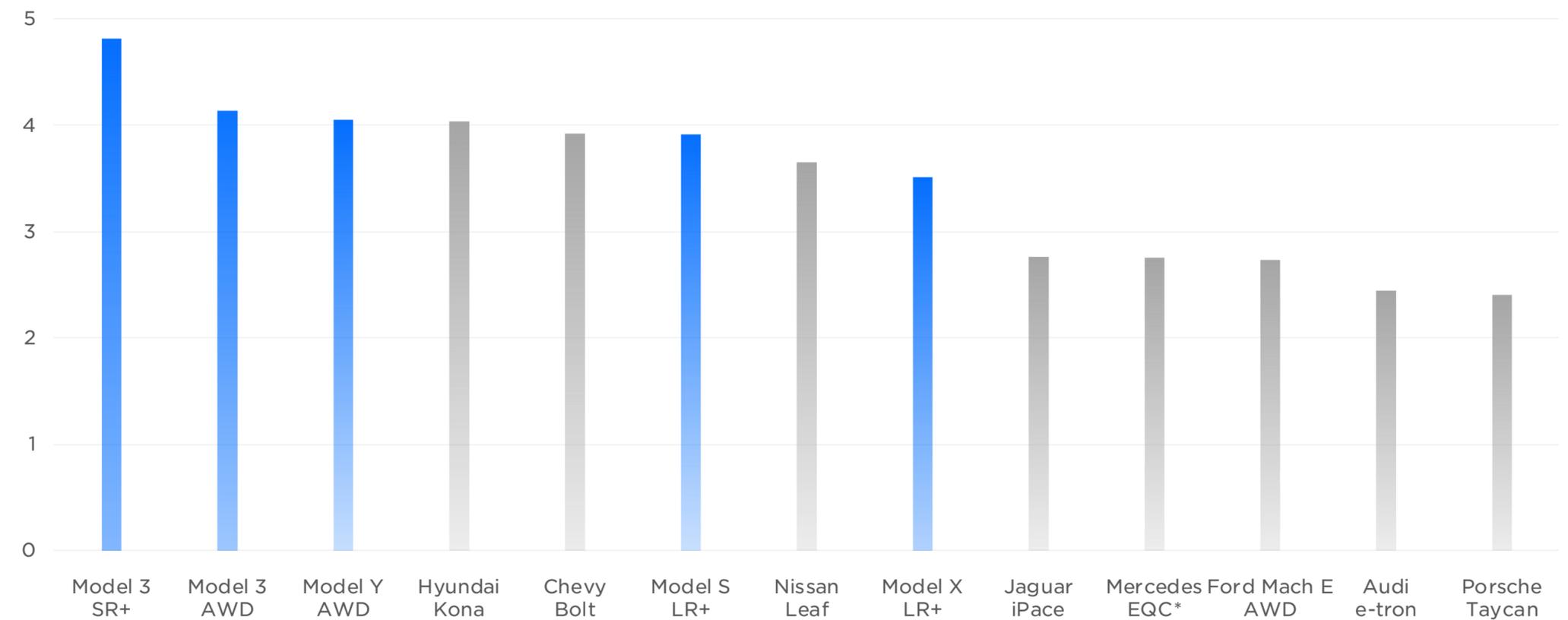
Tesla vehicles are known to have the highest energy efficiency of any EV built to date. In the early days of Model S production, we were able to achieve energy efficiency of 3.1 EPA miles / kWh. Today, our most efficient Model 3 Standard Range Plus (SR+) achieves an EPA range of 4.8 miles / kWh, more than any EV in production. Model Y all-wheel drive (AWD) achieves 4.1 EPA miles / kWh, which makes it the most efficient electric SUV produced to date.

The energy efficiency of Tesla vehicles will continue to improve further over time as we continue to improve our technology and powertrain efficiency. It is also reasonable to assume that our high-mileage products, such as our future Tesla Robotaxis, will be designed for maximum energy efficiency as handling, acceleration, and top speed become less relevant. That way, we will minimize cost for our customers as well as reduce the carbon footprint per mile driven.

Average Lifecycle Emissions in U.S. (gCO<sub>2</sub>e/mi)



Energy Efficiency EPA range in miles/kWh



\*Tesla estimate.  
Source: OEM websites

## Reducing Carbon Footprint Even Further Reducing Emissions at our Factories

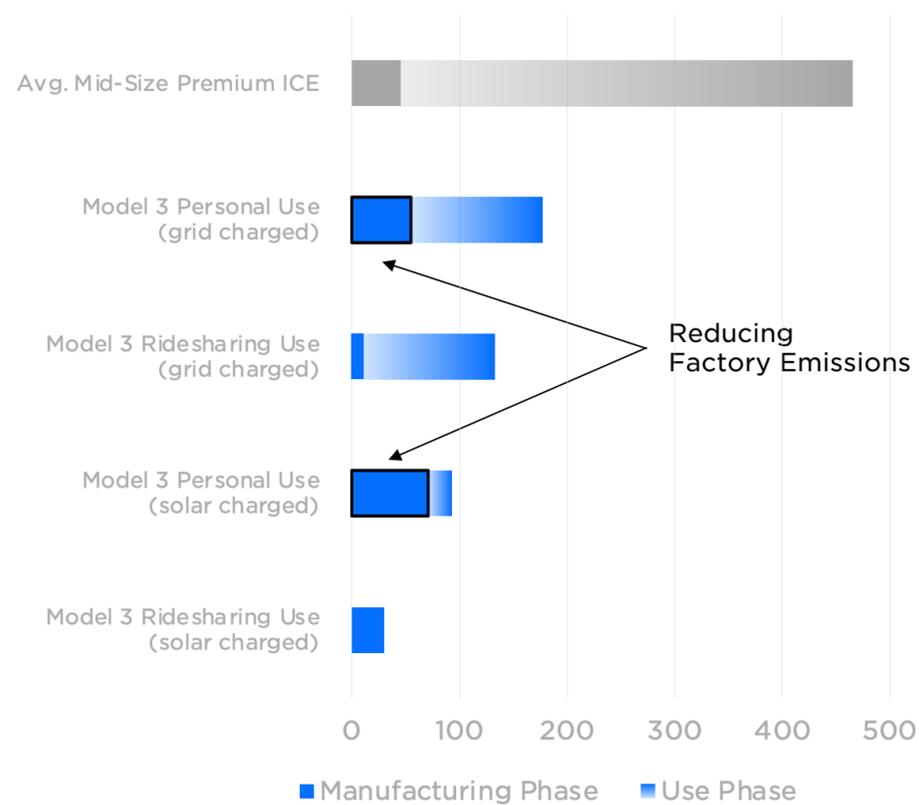
While emissions from the manufacturing phase can account for a relatively minor portion of lifetime vehicle emissions when compared to the use-phase, it is still an important part of lifecycle emissions. Thus, we strive to source as much renewable energy where possible for our factories in an effort to reduce our manufacturing-phase emissions.

As we continue to ramp production of Tesla products, we are committed to making significant progress towards our goal of operating global Tesla manufacturing, vehicle charging, and other operations using 100% renewable energy.

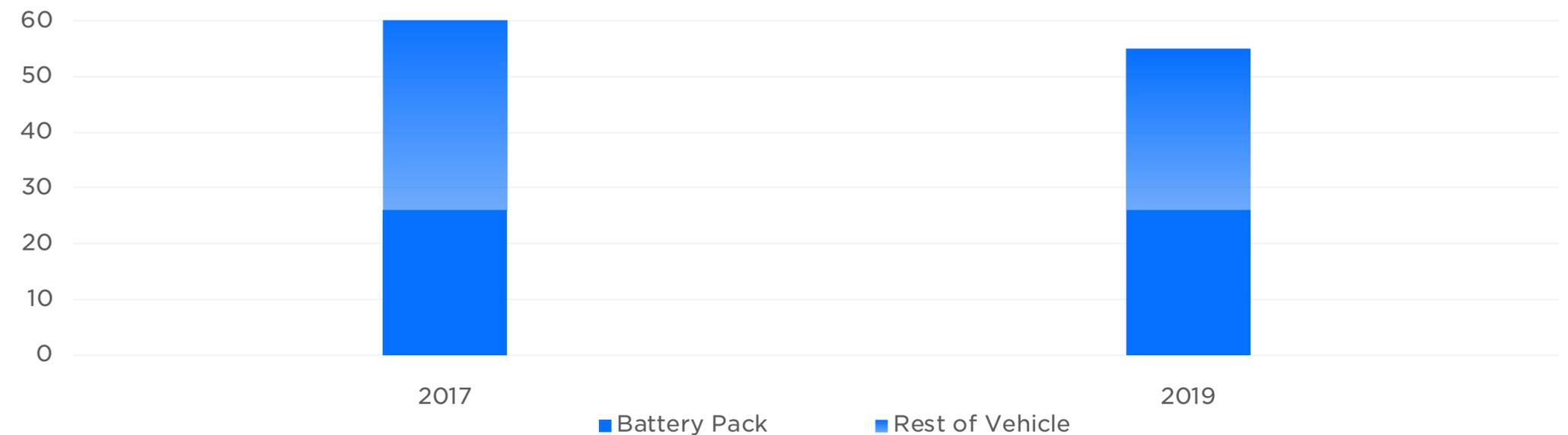
Predominantly due to lack of reliable data, various third-party studies tend to overstate the actual energy requirement, and therefore the associated emissions, for battery manufacturing. In fact, in 2019, the emissions from producing a full EV were nearly comparable to than the emissions from producing an average ICE vehicle. That said, battery manufacturing technology continues to improve rapidly, and we expect the EV manufacturing energy requirement and associated emissions to drop significantly in the near future.

In the second half of 2018, Tesla launched an Operations Energy Efficiency Program (OEEP) aimed at reducing energy usage across our factories in Fremont, Nevada, and Buffalo. In 2019, the OEEP helped us to achieve energy consumption reductions while we simultaneously ramped new lines and products across the three facilities. Our goal is to install as many solar panels as is practically feasible on the roofs of all of our manufacturing facilities.

Average Lifecycle Emissions in U.S. (gCO<sub>2</sub>e/mi)



gCO<sub>2</sub>e/mi for Model 3 Battery Pack versus Rest of Vehicle



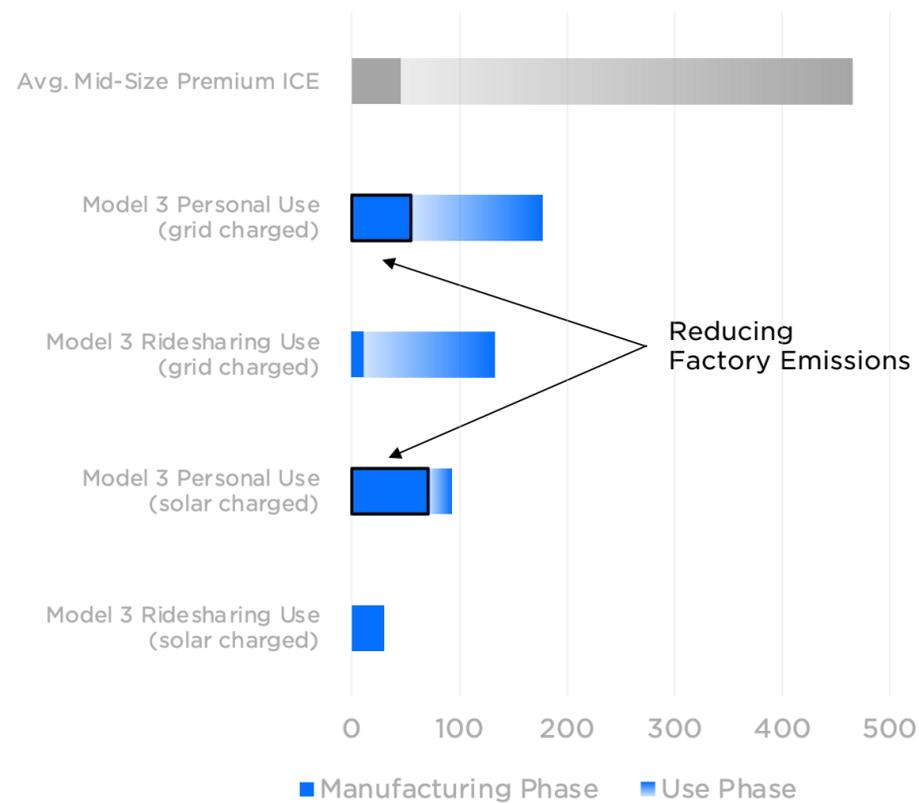
## Reducing Carbon Footprint Even Further Reducing Emissions at our Factories – Gigafactory Shanghai

Underpinning our strategy for regional manufacturing is a reduction of carbon emissions that result from shipping parts and finished products. From a sustainability standpoint, having vertically integrated Tesla factories in each region helps to reduce the carbon footprint for our operations.

As highlighted in Tesla's fourth quarter earnings call for 2019, reductions in shipping costs as well as the strain on the environment from avoided trans-oceanic shipping also makes good business sense. A simplified factory design and localized supply chain near the factory saves time and creates efficiencies, and localized delivery saves outbound logistics costs.

Our newly opened Gigafactory outside of Shanghai, China has provided us the opportunity to set up and implement the most simplified flows based on what we have learned from the operation of our U.S. factories. The design simplification and operational efficiencies result in time and monetary savings for Gigafactory Shanghai and less carbon emissions per vehicle produced.

Average Lifecycle Emissions in U.S. (gCO<sub>2</sub>e/mi)



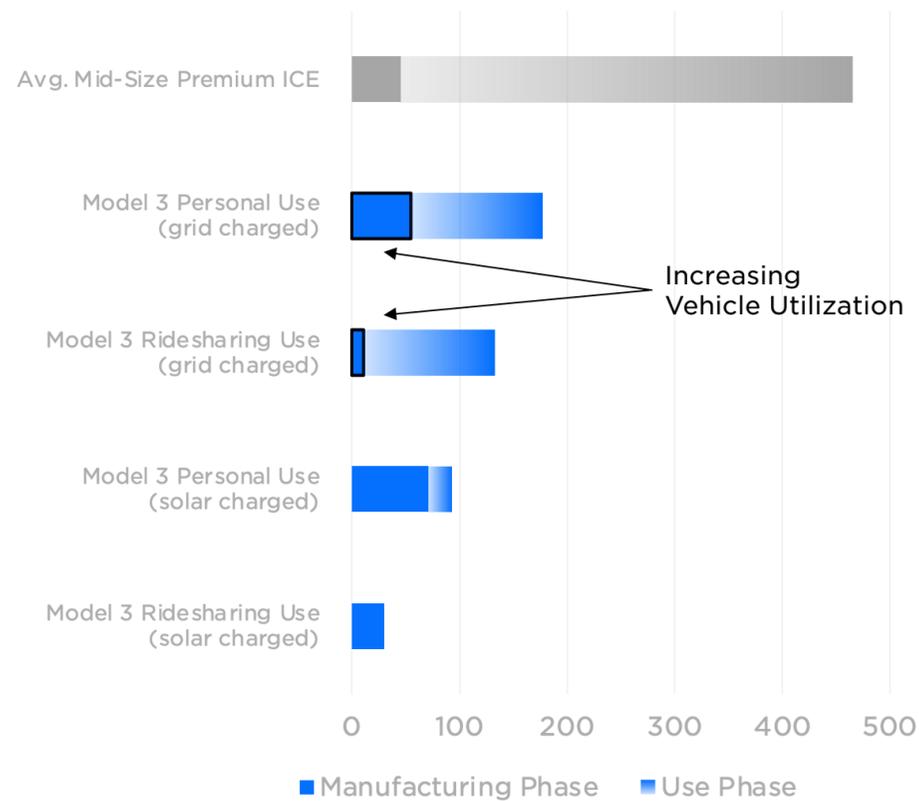
## Reducing Carbon Footprint Even Further Increasing Vehicle Utilization

Tesla's battery packs are designed to outlast the car. We estimate that a vehicle gets scrapped after approximately 200,000 miles of usage in the U.S. and roughly 130,000 miles in Europe. Creating a battery that could instead last for a 1,000,000 miles (4,000 to 5,000 charging cycles) would dramatically reduce emissions per vehicle produced.

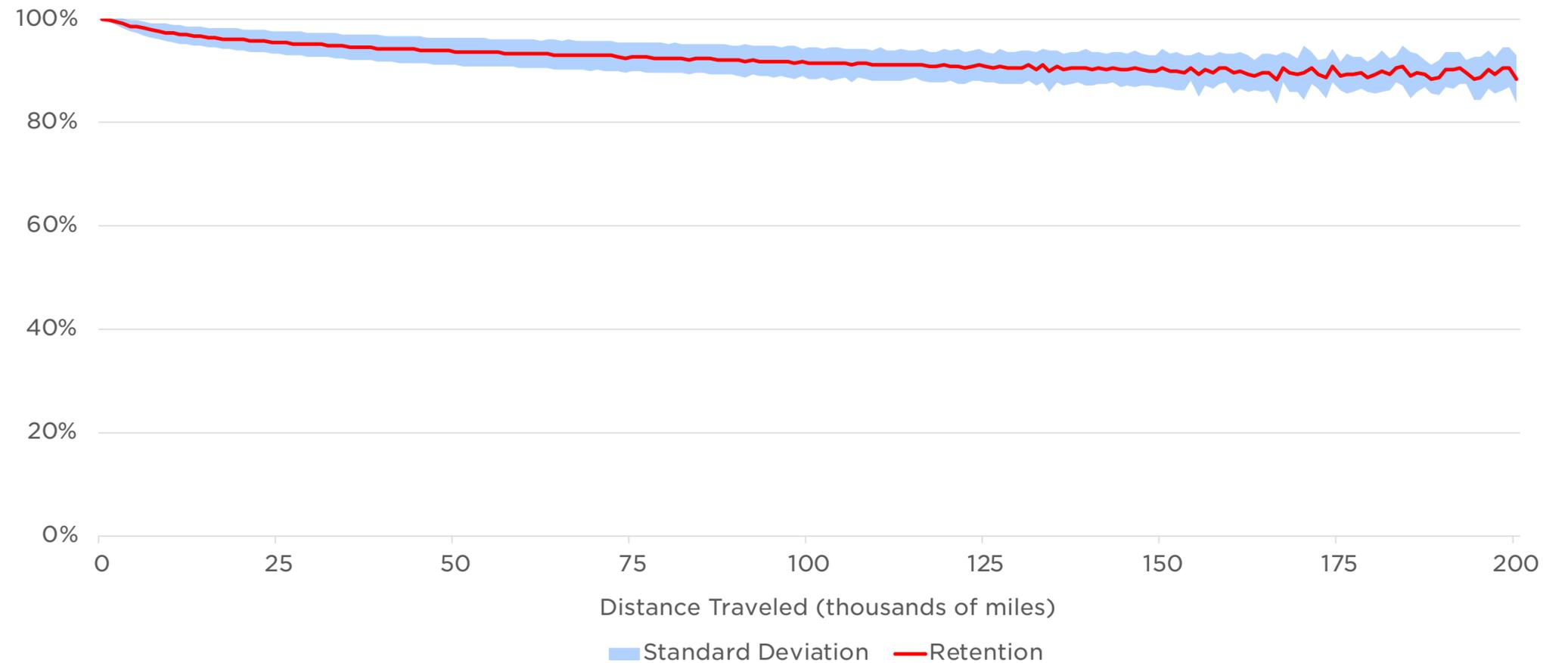
All vehicles in the world combined travel trillions of miles every year. A relatively small number of vehicles, such as taxis, delivery vans, trucks, or buses, account for a disproportionate amount of vehicle miles and as a result, a disproportionate amount of emissions.

A single future Tesla vehicle with a million-mile battery could be utilized over five times more than an average vehicle in the U.S. (almost eight times more than an average vehicle sold in Europe). As a portion of the carbon footprint is emitted during the production phase of each vehicle, utilization of such vehicle over 1,000,000 miles dramatically reduces the lifetime carbon footprint per each mile travelled. Furthermore, battery recycling has the potential to further reduce emissions as components of a battery pack can be captured and reused, displacing much of the need for raw material mining and the associated emissions.

Average Lifecycle Emissions in U.S. (gCO<sub>2</sub>e/mi)



Tesla Model S/X Battery Capacity Retention per Distance Traveled



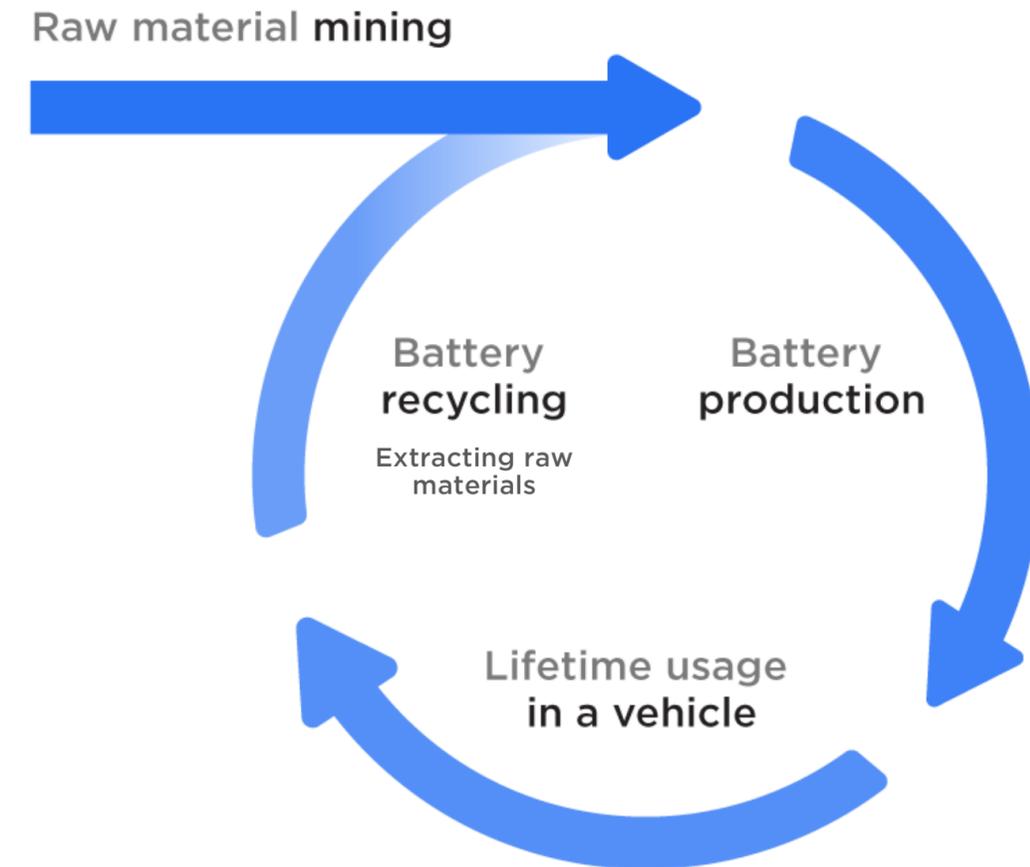
## Battery Recycling

A common question we hear is, “What happens to Tesla vehicle battery packs once they reach their end of 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 harmful emissions into the atmosphere that are not recovered for reuse. Battery materials, in contrast, are refined and put into a cell, and will still remain in the cell at the end of their life, when they can be recycled to recover valuable materials for reuse over and over again.

Extending the life of a battery pack is a superior option to recycling for both environmental and business reasons. For those reasons, before decommissioning a consumer battery pack and sending it for recycling, Tesla does everything it can to extend the useful life of each battery pack. Any battery that is no longer meeting a customer’s needs can be serviced by Tesla at one of our service centers around the world.

Tesla’s current vehicle batteries are designed to outlast our cars. We estimate an average ICE vehicle in the U.S. is scrapped after 17 years of usage, by which time it will have ~200,000 miles on its odometer. Data from our fleet of over 1 million Tesla vehicles on the road shows that our vehicles that have been driven between 150,000 and 200,000 miles had battery packs that degraded by less than 15% on average.

## Battery Materials Lifecycle



## Battery Recycling at Gigafactory Nevada

Global annual amount of li-ion battery metals sent for recycling by Tesla in 2019

1,000

Tons of Nickel

320

Tons of Copper

110

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.

Tesla battery packs are made to last many years and therefore we have only received a limited number of these batteries 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 landfilling, and 100% are recycled. The small amount of post-consumer batteries that we receive are generated from our fleet of vehicles on the road, predominantly from taxi-like vehicles. Since we have only been producing Model S for approximately eight years, it will likely be some time before we start receiving back vehicle batteries in larger volumes.

All materials contained in a battery remain in their original form at end-of-life and the vast majority of these materials are then captured in the recycling process. Presently, only high-value elements are recycled and re-introduced into the supply chain. However, as recycling technology improves, we strive to re-introduce more and more materials back into their original commodity markets. Over half of the materials in a battery cell are metals, which is great for sustainability given they are infinitely recyclable. The remaining materials are plastics, organics, and other difficult to re-use materials. Research is underway by organizations all over the world to improve the ability to recycle these remaining materials.

Today, we work with third-party recyclers around the world to process all scrap and end-of-life batteries to recover valuable metals. Our recycling partners work with us to ensure that non-valuable or non-recoverable materials from the batteries are disposed of responsibly.

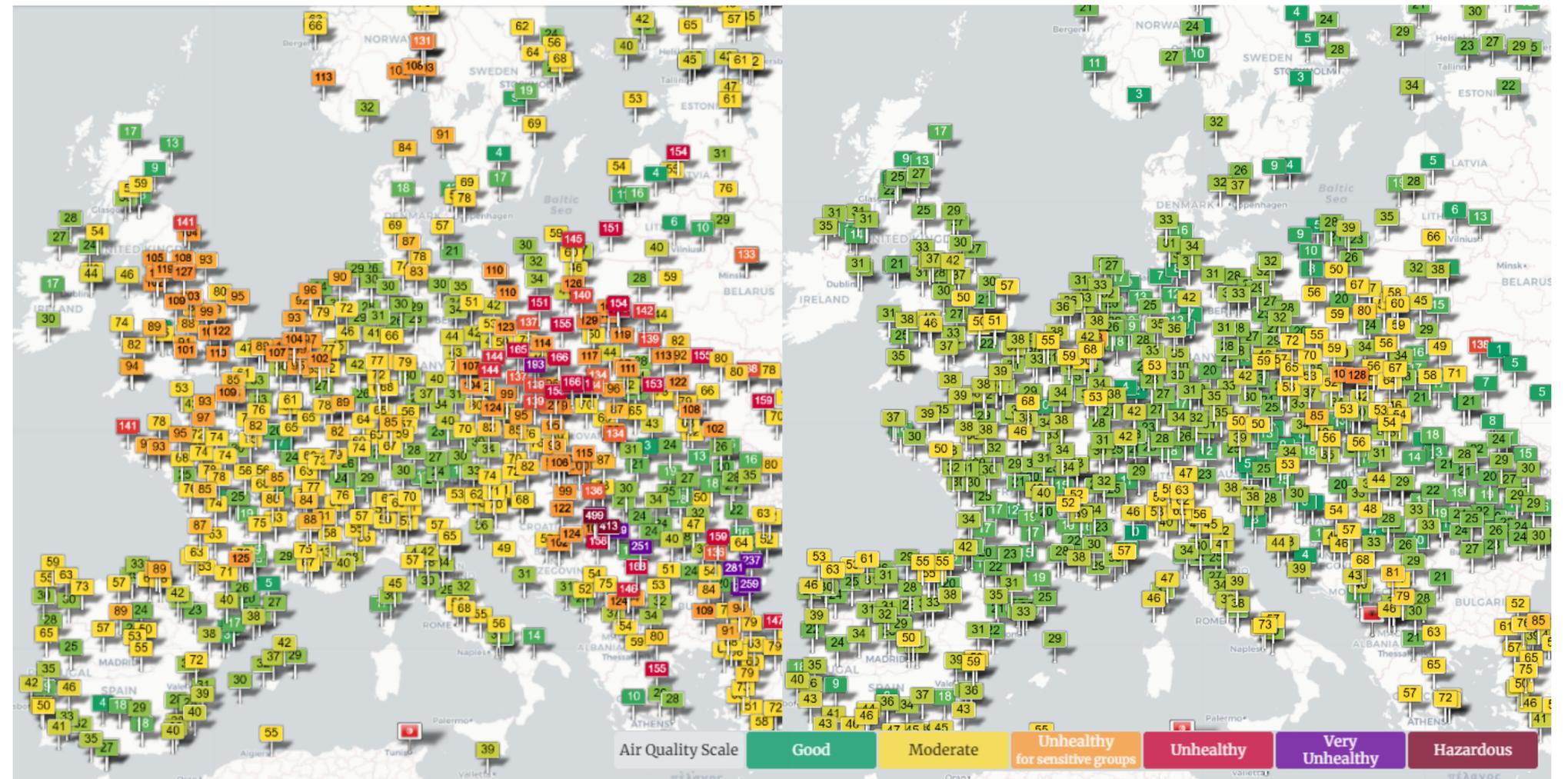
Tesla is currently developing a unique battery recycling system at Gigafactory Nevada that will process both battery manufacturing scrap and end-of-life batteries. Through this system, the recovery of critical minerals will be maximized along with the recovery of all metals used in Tesla battery cells, such as copper, aluminum and steel. Our ultimate goal is to develop a recycling processes that has high recovery rates, low costs, and a 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 and transporting new materials to put into cells.

## NOx, Particulates and Other Pollutants

Pollutants cause about 4.2 million deaths every year globally. According to researchers, such pollutants cause more premature deaths than smoking or infectious disease. While air-quality can often be categorized as a problem for cities in developing countries, Nitrogen oxide (NOx) and other PM2.5 particulates\* cause significant issues in developed countries as well. In Europe alone, almost 800,000 people die prematurely every year due to pollution related illnesses. EVs not only reduce the total carbon footprint, but also help to reduce city pollution.

Cities around the world are gradually setting targets for banning diesel vehicles, which are known for high NOx and particulate emissions. We have seen throughout the first half of 2020 that air quality can rapidly improve with the reduction of ICE-related traffic as the restrictions on business and travel due to COVID-19 has led to dramatically fewer miles being driven. It is not hard to imagine that many cities could become electric-only in the near future as they begin to witness the impact that ICE vehicles have on air quality.

Effects of Reduced ICE Vehicle Traffic in Europe: Air Quality Index in February 2020 versus May 2020



\*PM2.5 refers to atmospheric particulate matter (PM) that have a diameter of less than 2.5 micrometers and include combustion particles, organic compounds, metals, etc. Source: World Air Quality Index project (waqi.info)

## Water Used Per Vehicle Manufactured



Through efficiency improvements and water reuse systems, we work to lower the per-product water usage in our manufacturing process. In addition, water reduction efforts are included in our sales, service, and delivery facilities. Where possible, our service technicians use a waterless car wash method to maintain Tesla vehicles while minimizing environmental impacts.

In 2018, we established a water-use baseline for our manufacturing operations of 5.2 cubic meters of water per vehicle. In 2019, we reduced water usage by 45% to 2.9 cubic meters per vehicle. We will continue to look for ways to reduce our water intensity per vehicle produced, and as we increase production and operate more efficiently in coming years, we expect water use per vehicle to continue to decline.

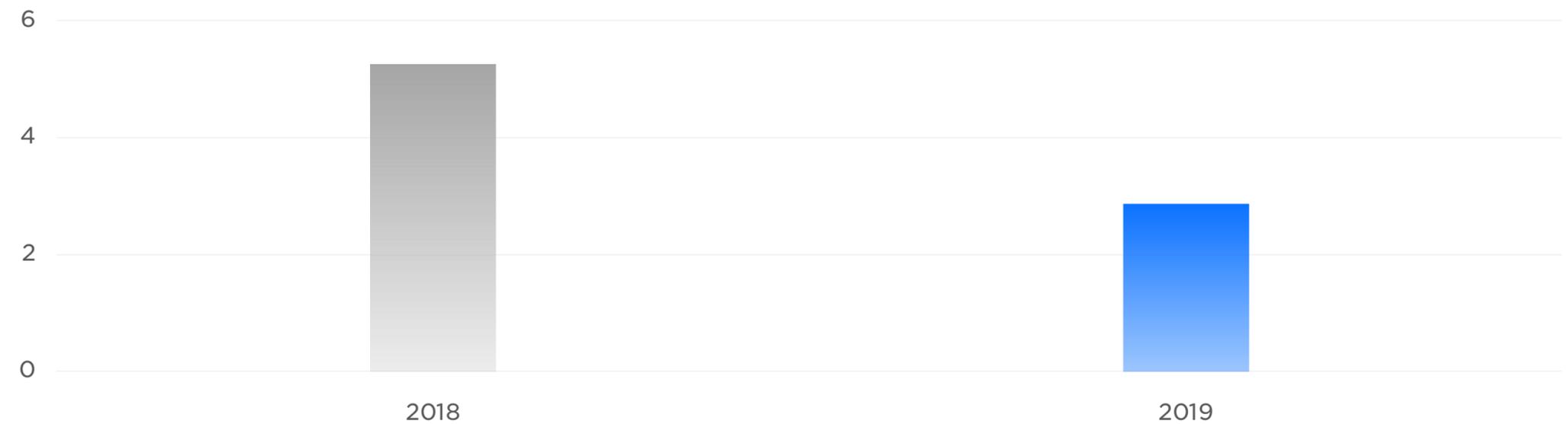
Our main manufacturing facilities are not only working to increase water-use efficiencies, but also to improve wastewater and stormwater management. These projects include reverse osmosis and distilled water system installations to improve water quality and to allow existing water sources to be recycled and reused in other processing areas such as the closed-loop system of our facilities' cooling towers.

Other projects include water mapping to identify opportunities for either recycling or increased passes in our closed-loop systems as well as leak identification. At Gigafactory New York, Tesla is dedicated to making our production activities supportive of the comprehensive cleanup and transformation of the Buffalo River and to ensure the waterway remains a rich environmental, economic and community resource.

## Water usage & power generation

While many recognize the impact that power generation has on CO2 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 also to cool power-producing equipment. This means that every kilowatt-hour (kWh) of clean solar energy produced not only lowers CO2 emissions, but also lowers water consumption.

Annual Water Consumption Per Tesla Vehicle Produced (m<sup>3</sup>)



## Emissions Credits Accelerating Deployment of New Factories



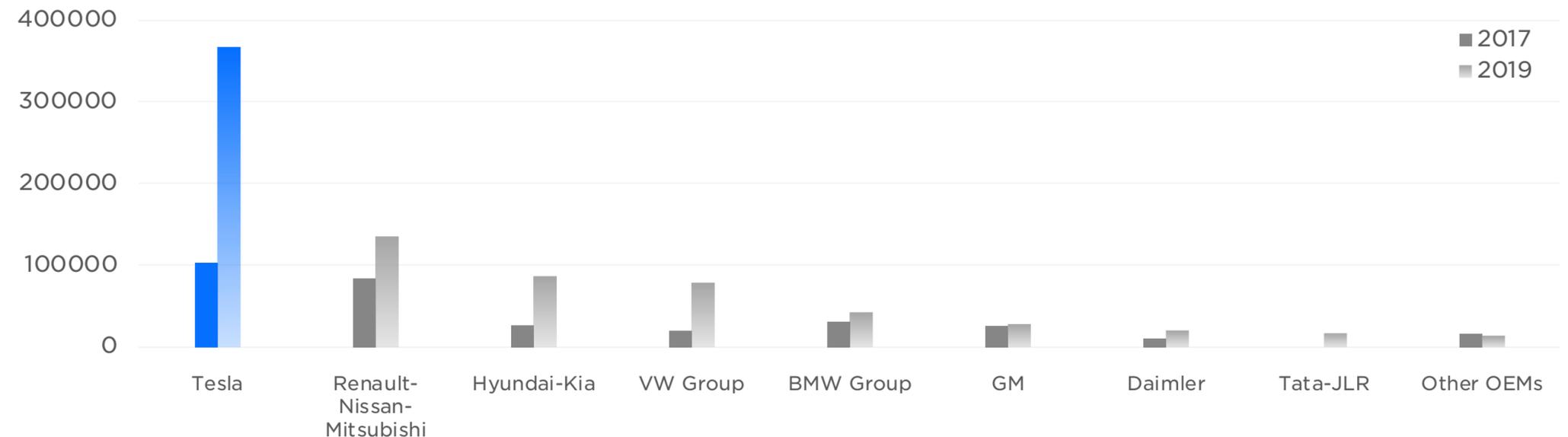
Emission credit systems around the world are designed to economically benefit companies with non-polluting products. In order to meet various emission targets and avoid government fines, polluting companies instead pay non-polluting companies through credit purchases. As a result, every manufacturer (OEM) is incentivized to reduce emissions by selling more EVs. We have seen strong positive signs from several OEMs who are launching competitive EVs rather than resorting to manufacturing “compliance cars”, which are usually EVs built on an ICE architecture. These vehicles are designed to meet regulatory requirements rather than to create the best possible product.

In 2019, we generated almost \$600 million of revenue selling zero emission regulatory credits to other OEMs. All of the proceeds from such sales will be used for 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 to offset their total CO2 emissions, it is not a sustainable strategy. In order to meet increasingly stricter regulatory requirements across the world, OEMs will be forced to develop truly competitive EVs.

In 2019, Tesla delivered over 367,000 EVs globally: That is more than 2x as many as any other automaker in the world and almost 3x as many as the largest non-Chinese automaker – Renault Nissan Mitsubishi Alliance. Chinese OEMs have been far more proactive when it comes to EV manufacturing, partially due to generous subsidies that have now decreased, and partially due to local support.

While many OEMs introduced new EV models in the past two years, their actual global deliveries of EVs increased only marginally. We hope that every car manufacturer will strive to produce hundreds of thousands of EVs per year. Significant reduction of emissions will only be achieved if all carmakers push for an industry-wide shift to EVs.

Electric Vehicles Sold (excl. Chinese OEMs)



Source: EV-volumes.com

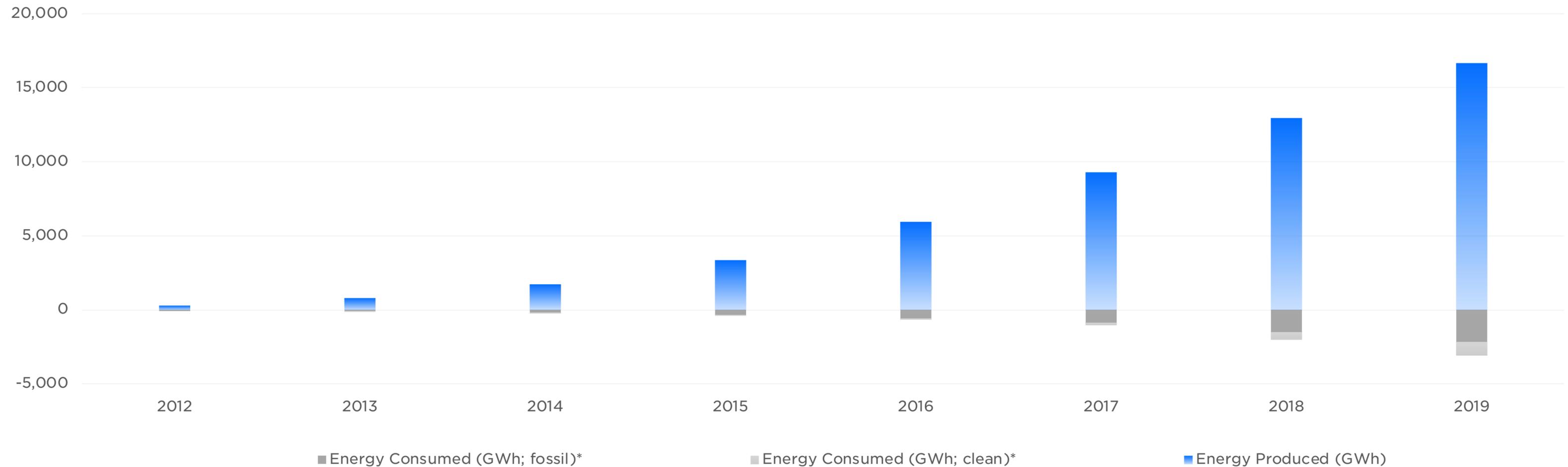
## Conclusion

### Net Energy Impact of Our Products

As of the end of 2019, Tesla (including SolarCity prior to its 2016 acquisition by Tesla) had installed almost 3.7 Gigawatts of solar systems and cumulatively generated over 16.6 Terawatt hours (TWhs) of emissions-free electricity. For reference, that is multiple times more energy generated by our installations than the total energy Tesla has used to run all of our factories since we began producing Model S in 2012.

It is our goal that eventually all of our manufacturing energy needs are satisfied through renewable sources where possible. Additionally, we are hoping to see more Tesla vehicle customers installing solar panels or Solar Roof along with a Powerwall. We are striving to always remain a net contributor to renewable energy generation.

Cumulative Energy Produced by Tesla Solar Panels vs. Consumed by Tesla Factories



\*Estimated based on state and country-level grid data supplied by DOE and IEA. Please see appendix for detailed explanation of energy consumption figures.

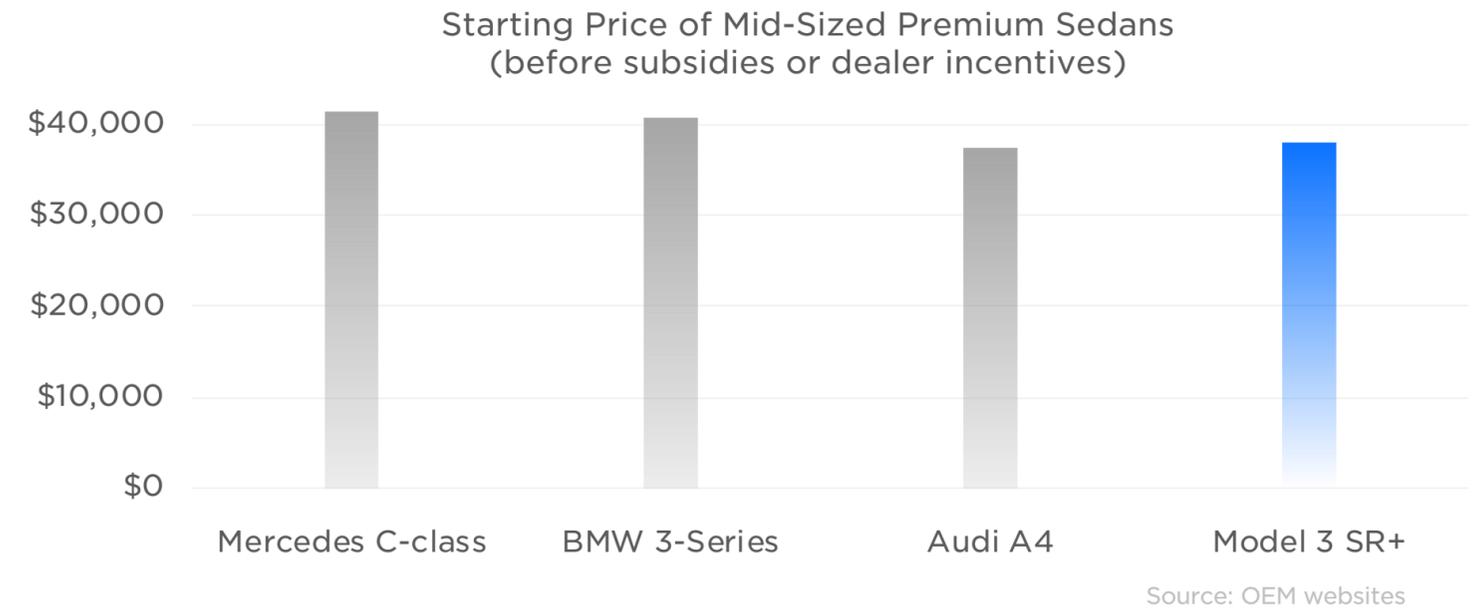
# Product Impact



## Price Equivalency

The foundation of Tesla's 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.

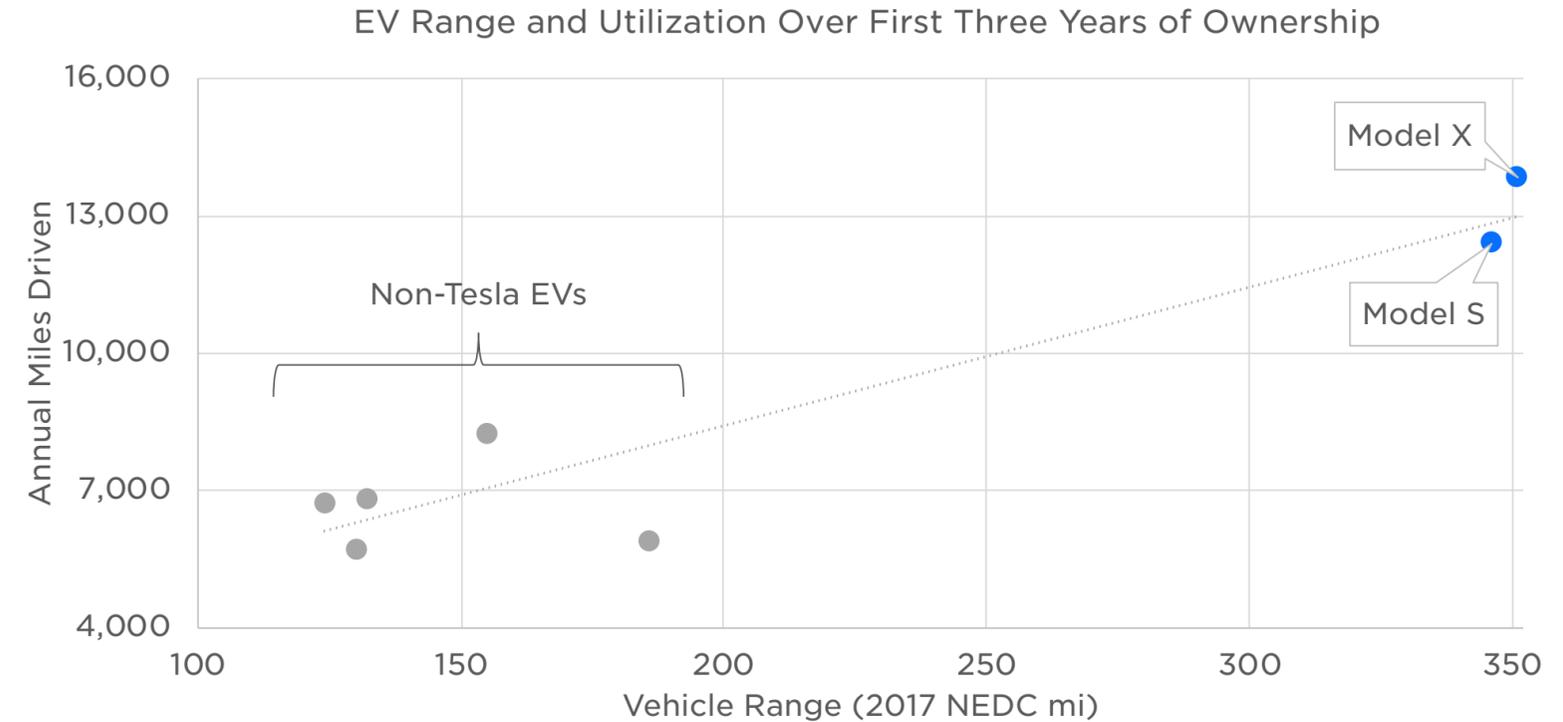
The Model 3 is the first EV in history priced on par with its gas-powered equivalents, even before taking into consideration any regional subsidies and lower running costs. Unfortunately, most other EVs on the market today are still priced at a \$10,000 to \$20,000 premium to their direct ICE vehicle equivalents.



## Primary Driver

Making our products available to as many people as possible is key to our ability to achieve our mission. Since its founding, Tesla has been focused on increasing the utility of products - making them better and more useful to our customers - while at the same time making them increasingly more affordable. Tesla fundamentally believes that you shouldn't have to choose between price, quality, usability, and sustainability.

There is clear relationship between range, how often an EV is utilized, and whether or not it is a primary-use vehicle. If owners are confident that their EV can be used for commuting, errands, and long road trips alike, the lower the likelihood 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 with an EV.



Source: RAC Foundation, [ev-database.uk](http://ev-database.uk) (archived materials)

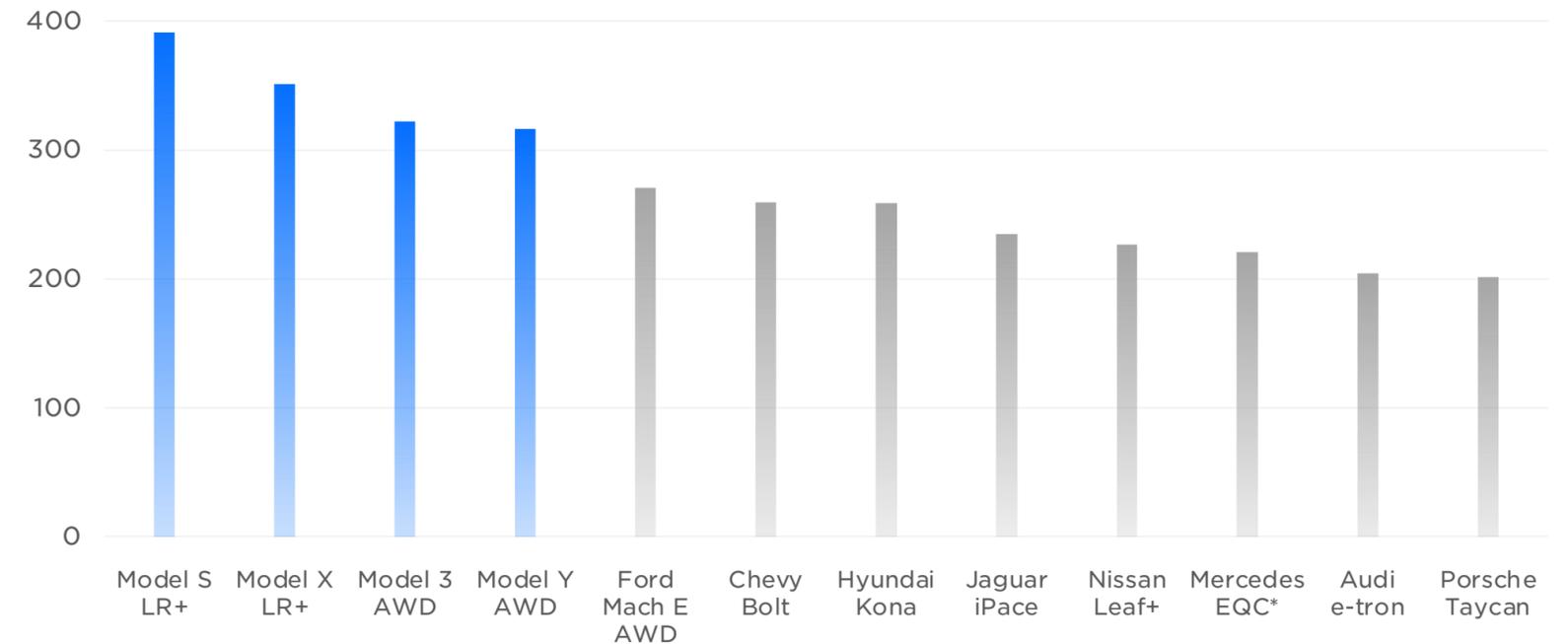
Data tracking annual miles driven during the first three years of ownership, collected by the RAC Foundation in the U.K., show a clear relationship between an EV's range and the annual mileage driven. The Model S and Model X (shown in blue) have by far the highest range and most annual miles driven.

# Long Distance Travel

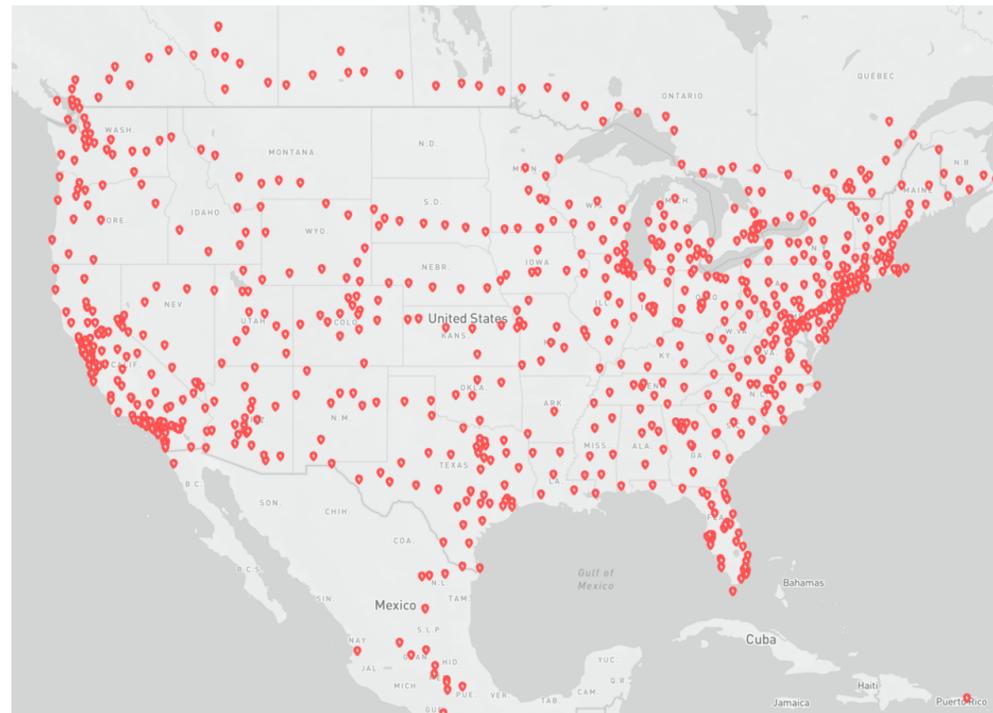
In order to ensure we displace as many ICE vehicles with EVs as possible, we have been focused on increasing the range of Tesla vehicles. While the vast majority of personal vehicle journeys are relatively short and thus drivable on a single charge, consumers don't buy cars that can meet most of their needs; they want cars that meet all of their driving needs. Since its introduction in 2012, the range of the Model S has increased by almost 50%, from 265 miles to 391 miles of range for the long-range variant. Our focus on energy efficiency - achieving superior range from the same size battery - is how the Model Y is able to achieve similar range to the Model 3, despite being 10% heavier. Furthermore, the Model Y is by far the most efficient EV in its class, enabling an EPA range of 316 miles.

While we continue to strive to provide range that is sufficient for as many trips as possible without interruption, we understand that a robust fast-charging network that covers popular travel routes is critical for those trips that exceed our vehicles' range. That is why we have spent many years building our Supercharger Network across North America, Europe, China and APAC, which almost doubled in size between 2017 and 2019, and continues to expand today.

EPA Range of Long-Range EVs



\*Tesla Estimate; Source: OEM websites



## Active Safety

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 enhanced 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.

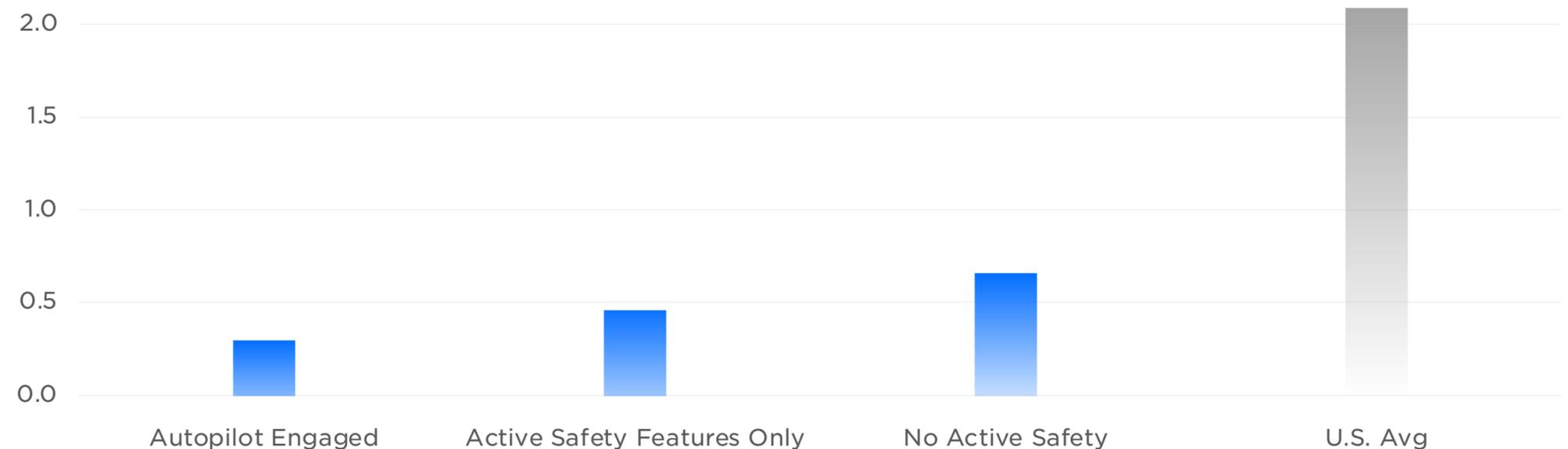
Because every Tesla car made since October 2016 is equipped with the necessary sensor suite for full self-driving, each of these cars also support our autonomous driving development. Tesla's vertical integration and scale provides the company with billions of miles of global real-world data that is gathered as Tesla vehicles are driven. This helps us identify edge cases, train our autonomous driving system, and test how a feature would perform in the real-world, without actually activating them.

Our approach to autonomy is rooted in incremental software updates that increase a car's capability over time:

- First, we build new features or updates using insights from real-world data collected by our fleet on the road, and we then validate these based on large-scale data sets.
- Prior to rolling out a feature or update, we may test it in Shadow Mode to determine how a feature would perform in the real-world before it is released, or share it with members of our voluntary, invite-only Early Access Program for their input before it is released broadly.
- Once a new feature has been thoroughly tested and fully validated, we release it to our fleet of vehicles through an over-the-air software update. Since introducing our Full Self-Driving Hardware, Tesla has already released dozens of software updates that have made our cars smarter and more capable, including features like Navigate on Autopilot.

In 2019, a Tesla vehicle with Autopilot engaged in the U.S. experienced just 0.3 accidents per million miles driven while the U.S. average was ~7x higher at 2.0 accidents per million miles driven. Even in cases where only active safety features were engaged, our vehicles had a ~4.5x lower collision rate than the U.S. average in 2019.

Numbers of Vehicular Accidents per Million Miles Driven (2019)



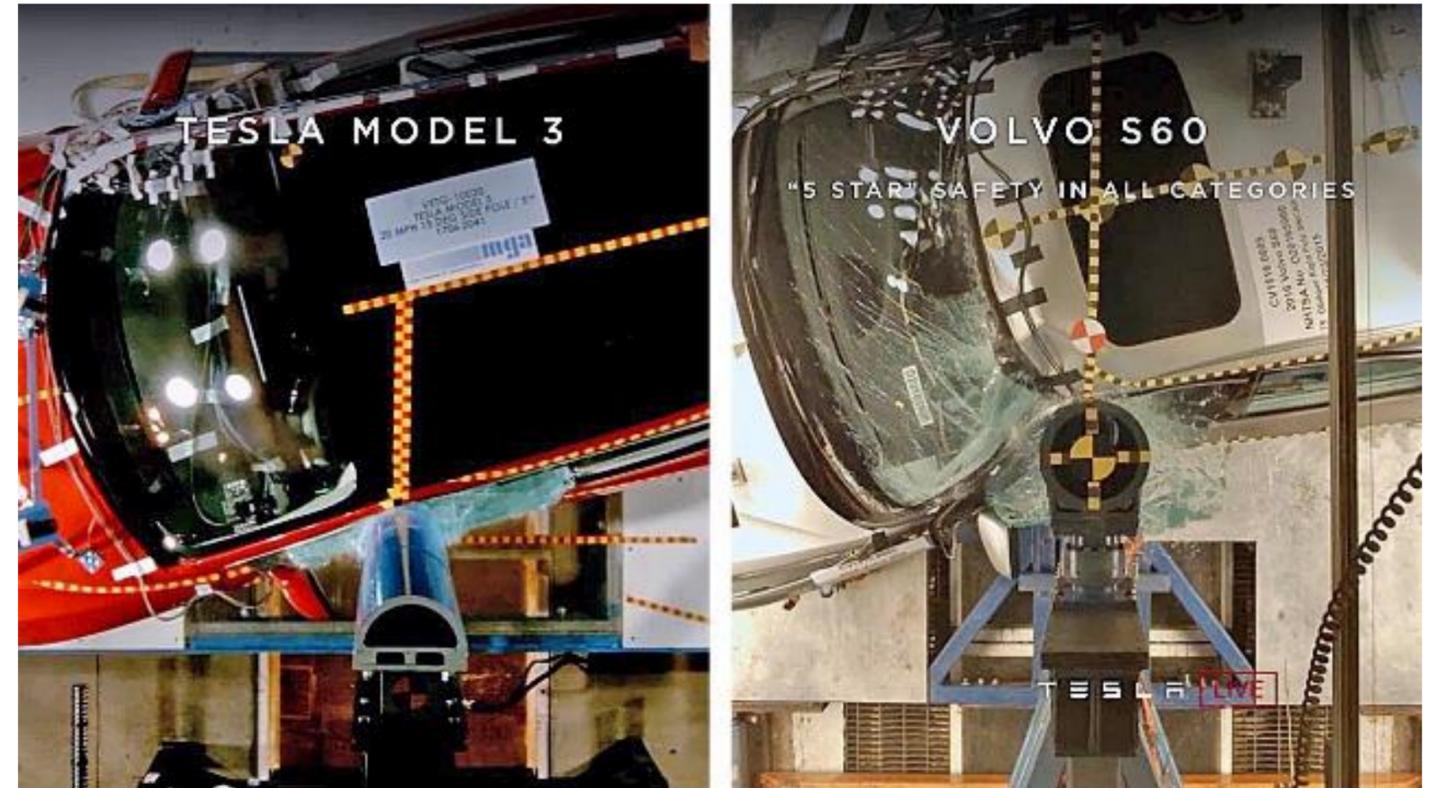
For the latest quarterly accident data related to our vehicles, please view our [Vehicle Safety Report](#).

## Passive Safety

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

Based on the advanced architecture of Model S and Model X, we engineered Model 3 and Model Y to be the safest cars built to date. Even though Model 3 and Model Y have no engine, their performance is similar to a “mid-engine 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, it also improves the capability of stability control by minimizing rotational kinetic energy.

After putting Model 3 through a series of crash tests used as part of its 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 Model 3 a perfect 5-star safety rating in every category and subcategory.



## Tesla Safety Awards

In 2019 alone, Tesla vehicles earned 5-star ratings from safety rating agencies across the U.S., Europe, and Australia, and if these ratings are all added up, have received over 100 stars in total. 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 don't believe that safety should be optional.

### Rating Agency

#### Model X

#### Model 3

**NHTSA**  
**US New Car**  
**Assessment Program**  
NCAP

★★★★★ rating in every category for all variants  
Only SUV ever to receive 5-star rating in every category

★★★★★ rating in every category for all variants  
Best Vehicle Safety Score (VSS) ever achieved according to published NHTSA data

**European New Car**  
**Assessment Programme**  
Euro NCAP

★★★★★ rating in every category for all variants  
Best-in-class award for Large Off-Road vehicles  
Best-in-class runner-up award for Hybrid and Electric Vehicles  
(second to the Model 3)

★★★★★ rating in every category for all variants  
Best-in-class award for Large Family Car  
Best-in-class award for Hybrid and Electric Vehicles

**Australasian New Car**  
**Assessment Program**  
ANCAP

★★★★★ rating in every category for all variants  
Featured as a "Top Performing Vehicle" for 2019

★★★★★ rating in every category for all variants  
Featured as a "Top Performing Vehicle" for 2019

**Insurance Institute for**  
**Highway Safety**  
IIHS

Not Rated

Received 2019 Top Safety Pick +  
Earned the highest possible rating ("Good" or "Superior") in each of the crashworthiness and crash avoidance/mitigation tests required for the Top Safety Pick + award

## Fire Safety

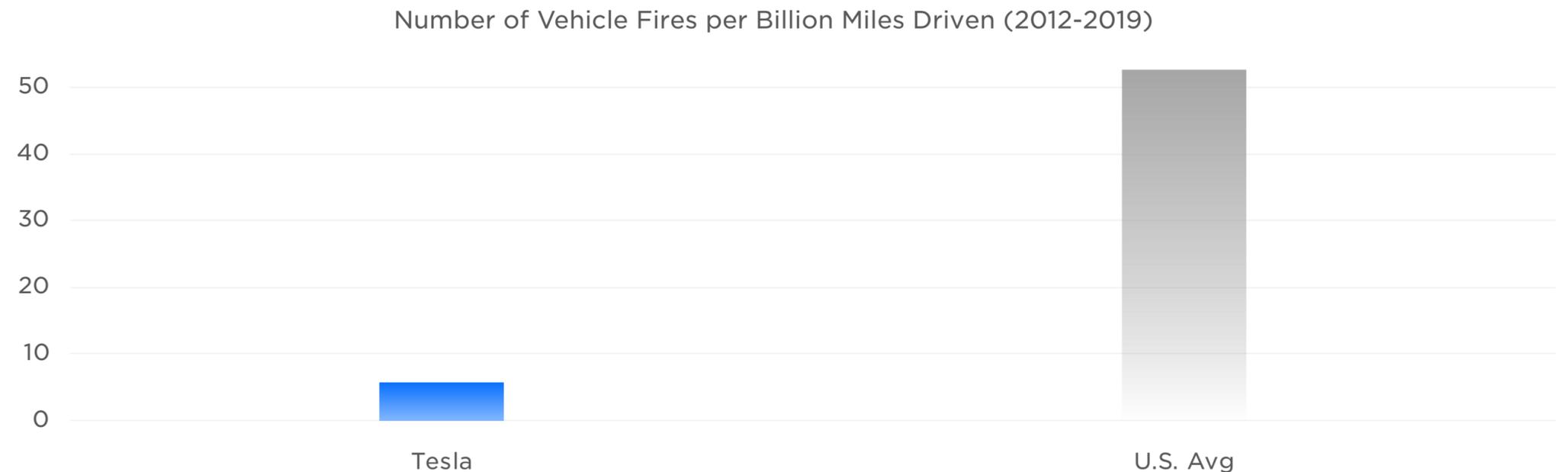
When the media reports a story about a vehicle fire, it is usually reporting on an EV fire. This is likely a result of the novelty of EV technology, rather than the prevalence of EV-related fires compared to ICE vehicle-related fires. The reality is, when compared to Tesla vehicles, ICE vehicles catch fire at a vastly higher rate. According to the latest available data, in 2018, there were over 180,000 vehicle fires in the U.S. alone.

Due to this public misconception, we decided to start publishing vehicle fire data annually. From 2012 to 2019, there has been approximately one Tesla vehicle fire for every 175 million 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 is one ICE vehicle fire for every 19 million miles traveled.

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 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.

Finally, for the rare instances where Tesla vehicles are involved in a fire, we make [detailed information](#) available for first responders so they can safely handle those emergency situations.



## Cyber Security

At Tesla, we are constantly focused on ensuring that our vehicles are the most secure on the road. To do that, our team of world-class engineers works day in and day out to ensure that our systems are always as secure as possible. And while some of the best security engineers work at Tesla, we believe that in order to design and build inherently secure systems, we cannot work alone. Instead, we believe we must work closely with the security research community to benefit from their collective expertise and diversity of thought. Here's a snapshot of what we do:

### Continuous Product Improvement

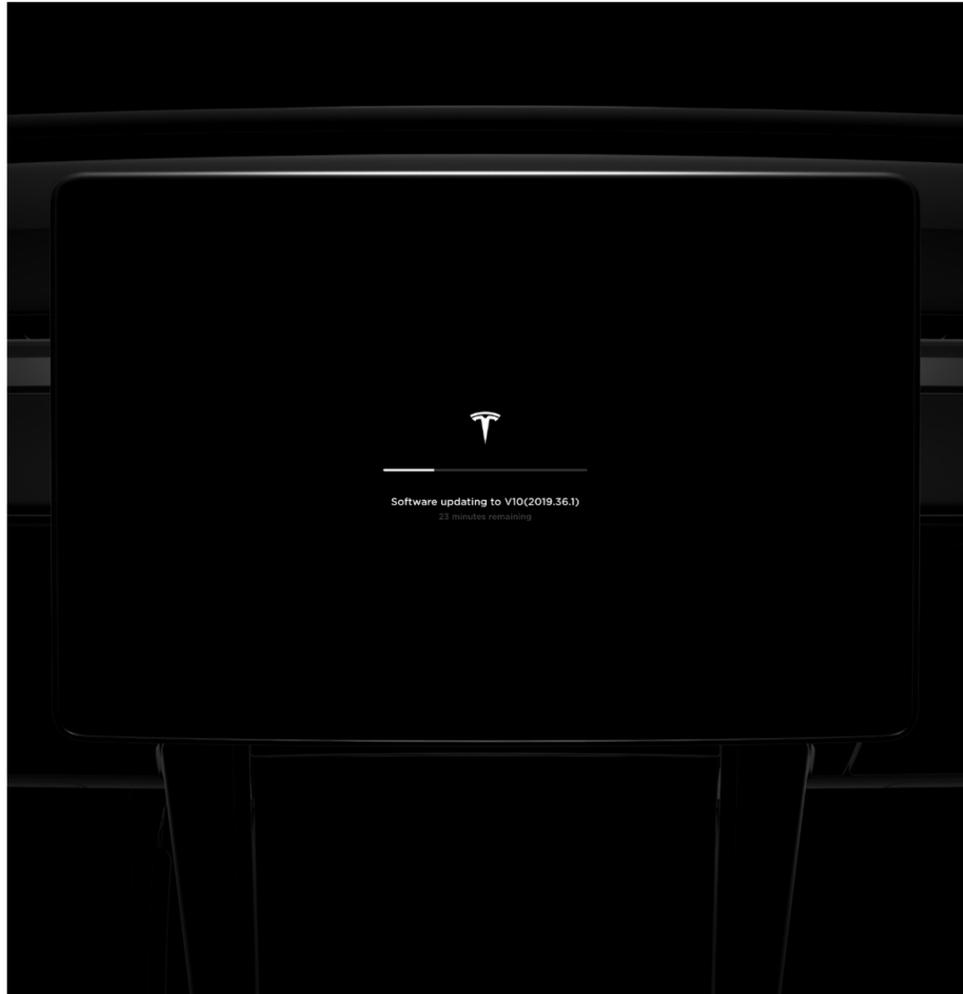
Tesla pioneered the concept of vehicles that improve and become more capable over time, by ensuring that every Tesla vehicle made since 2012 can accept over-the-air software updates. These updates have introduced new features and functionality that have made our vehicles smarter, safer, and more enjoyable to drive. We've also used this system to ensure that our vehicles are not just as secure as possible when they are delivered, but that they continue to stay as secure as possible throughout their lifetime. To date, we are the only major automotive company capable of continual software enhancements across its entire vehicle fleet.

### Active Engagement

Whether through formal events, such as our Bug Bounty program or the Pwn2Own research competition, or less formal channels of communication, we are constantly working with academic researchers and security experts around the world. We have found that these relationships allow us to benefit from great work being conducted by stakeholders outside of our organization who are just as passionate about digital security as we are.

For example, when researchers found a vulnerability in the Model S key fob, they reported it to Tesla, allowing us to examine their report and engineer a new in-vehicle update for the key fob making it even more secure within a matter of seconds of the update.

The above examples are just a few of the many ways that our industry-leading team of security experts works every day to ensure our vehicles are the most secure ones on the road today.



# Disaster Relief

16,000+

Number of individuals served by Tesla disaster-relief projects (2018-2019)

40

Number of individual sites Tesla serviced after major disasters (2018-2019)

Solar and energy storage systems don't just provide clean, zero-emission energy, they also improve the reliability and resilience of the electric grid. For example, in the event of an electric grid outage, energy storage systems can immediately provide power to homes, communities, and businesses — functionality that can be particularly critical during a natural disaster.

From 2018 to 2019, Tesla provided disaster relief assistance to governments, non-profit organizations, and individuals following hurricanes in North Carolina, Florida, and the Bahamas, and during wild fires in California and Australia. In response to hurricanes, we provided temporary clean power solutions to 15 critical infrastructure sites through our solar panels and Mobile Powerwall Units, serving over 15,000 people. We also supported 500 people impacted by wildfires in California and dozens of animals displaced by Australia's bushfires by powering community relief centers and temporary housing. Many of the sites we supported immediately after a disaster are still powered by Tesla systems to this day.



## Resilience of The Grid

**\$50 million**

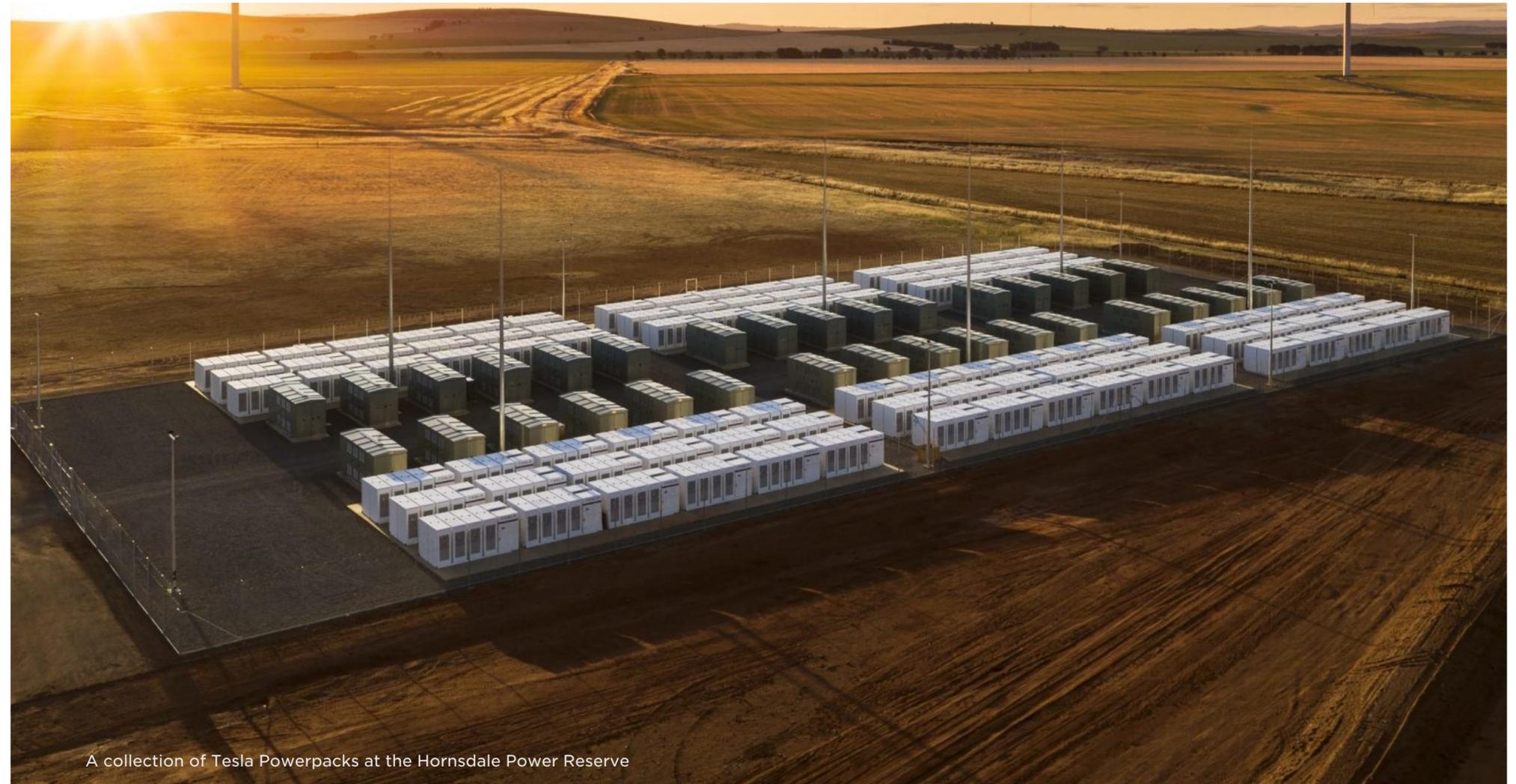
Savings achieved by the Hornsdale Project during its first year of operation

**<1 Second**

The amount of time it takes for a Powerpack to respond to sudden changes on the grid due to a disruption — this has been seen in action at Hornsdale Power Reserve, helping solve South Australia's chronic power outages.

In late 2016, a 50-year storm had damaged critical infrastructure in South Australia, causing a statewide blackout and leaving 1.7 million local residents without electricity. Further blackouts occurred in the heat of the Australian summer in early 2017. In response, the South Australian Government as a leader in renewable energy, looked for a sustainable solution to ensure energy security for all its residents. In December 2017, Tesla turned on the world's largest lithium-ion battery in South Australia at the Hornsdale Power Reserve.

In 2019, the project developer, Neoen, announced the expansion of the Hornsdale Power Reserve, increasing the project's capacity by 50%. The increase will provide further cost savings to customers, which totaled more than \$50 million in the project's first year of operation — only slightly less than the full cost of this project. Additionally, the expansion will provide inertia services to the network — a first for Australia and critical to further stabilizing the grid and supporting South Australia's goal of 100% renewable energy generation by 2030.



A collection of Tesla Powerpacks at the Hornsdale Power Reserve

# Introducing Megapack

**+60%**

Increase in energy density from Powerpack to Megapack

## 4x faster installation

The amount of times faster a Megapack can be installed compared to a traditional fossil fuel power plant of the same capacity

Battery storage is an increasingly important element of the world’s transition to sustainable energy. To match global demand for massive battery storage projects like Hornsdale, Tesla designed and engineered a new battery product specifically for utility-scale projects: Megapack.

By fully assembling Megapack at Gigafactory Nevada, we significantly reduced the complexity of large-scale battery storage, providing an easy installation and connection process. And with a 60% increase in energy density compared to Powerpack, Megapack achieves significant cost and time savings compared to other battery systems and traditional fossil fuel power plants.

Using Megapack, Tesla can deploy an emissions-free 250 MW, 1 GWh power plant in less than three months on a three-acre footprint – 4x faster than a traditional fossil fuel power plant of that size.

For utility-size installations, Megapack will act as a sustainable alternative to natural gas “peaker” power plants, which cost millions of dollars per day to operate and are some of the least efficient and most polluting plants on the grid. Instead, a Megapack installation can use stored excess solar or wind energy to support the grid’s peak loads.



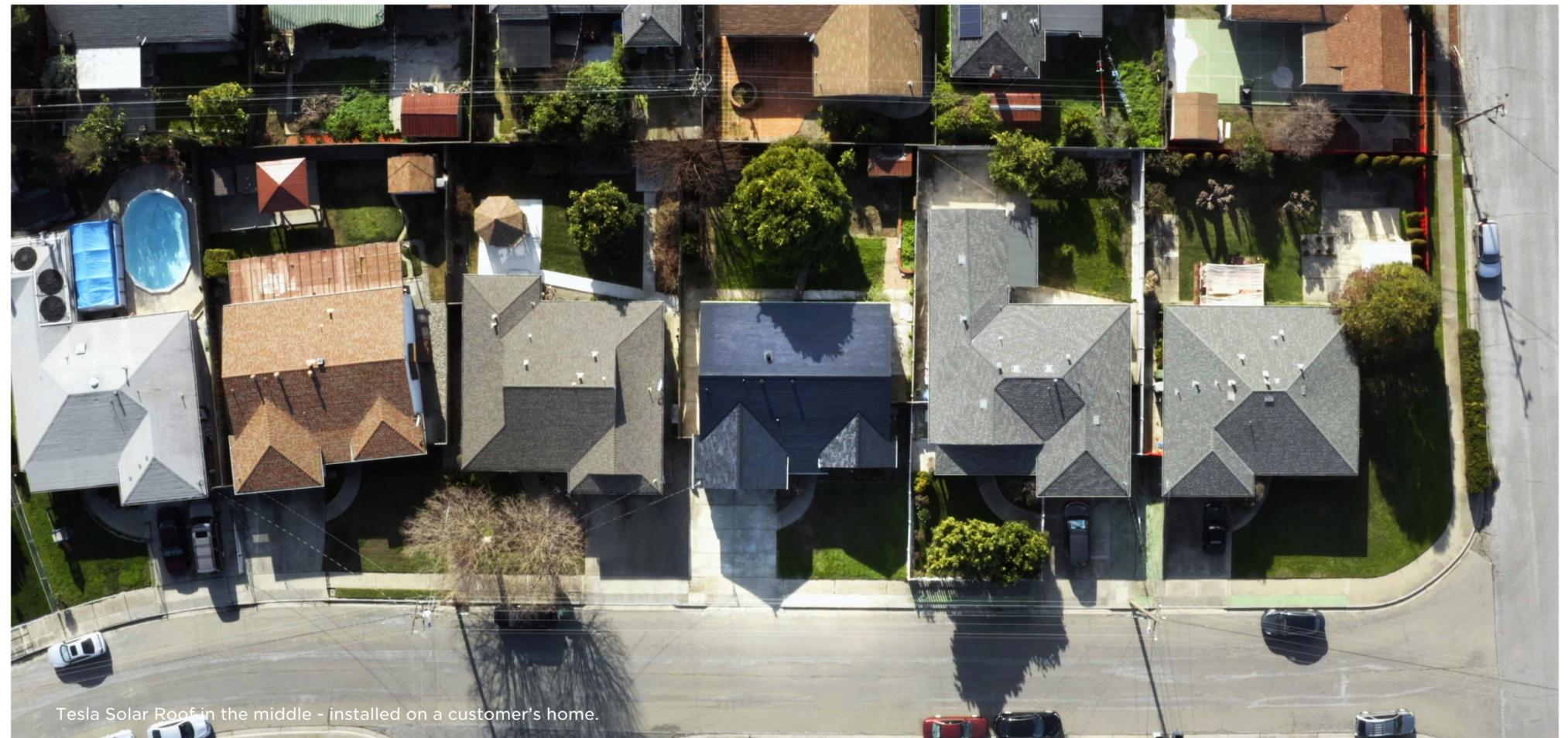
Tesla Megapack

## Solar Roof Opportunity

Anyone can dramatically reduce their carbon footprint by installing a Tesla Solar Roof or solar panels with Powerwall. In theory, all U.S. domestic electricity needs as well as vehicle transportation needs could be satisfied by sunlight alone.

The opportunity for Tesla's Solar Roof to make a material impact on the reduction of the U.S.'s residential carbon footprint is more substantial than generally appreciated. In many regions, Solar Roof costs less to install than a traditional roof combined with solar panels while being esthetically appealing at the same time.

According to the U.S. Department of Housing and Urban Development (HUD), in the U.S. alone, approximately five million roofs are being newly built or replaced every year. A price premium of a Solar Roof compared to a typical roof is just \$1.80 to \$2.50 per Watt before incentives. While payback periods vary across regions, electricity bill cost savings should outstrip this cost for almost any household in the U.S. For those customers, buying anything but Solar Roof no longer makes economic sense.



Tesla Solar Roof in the middle - installed on a customer's home.

# Supply Chain



## Supply Chain Introduction

### Responsible Material Sourcing

Tesla is committed to only sourcing responsibly produced materials. The [Tesla Supplier Code of Conduct](#) (“Code”) and our [Human Rights and Conflict Minerals Policy](#) outline our expectations of all suppliers and partners who work with us. Tesla is committed to making working conditions in our supply chain safe and humane, ensuring that workers are treated with respect and dignity and that manufacturing processes are environmentally responsible. Tesla suppliers are required to provide evidence of management systems that ensure social, environmental, and sustainability best practices in their own operations, as well as to demonstrate a commitment to responsible sourcing into their supply chains.

Our complex supply chain is a unique hybrid of the traditional automotive and high-tech industries, and encompasses suppliers from around the world. Many of our Tier 1 suppliers (i.e., direct suppliers) do not purchase all of their raw materials directly and instead obtain them from their suppliers and sub-suppliers. Therefore, reliably determining the origin is a difficult task, but the due diligence practices required of our suppliers adds transparency to help us and our suppliers adhere to the responsible sourcing principles of our Code.

Our Tier 1 automotive suppliers are required to register and complete the domestic and international material compliance requirements in the International Material Data System (IMDS) to meet EU and other international material and environmental related regulations. This requirement is mandated for all suppliers who supply their products or raw materials to us as part of our production-parts approval process. Tesla, along with our partners and independent third parties, conducts audits to observe these principles in action. If there is a reasonable basis to believe a supplier partner is in violation of the Code, Tesla will transition away from that relationship unless the violation is cured in a satisfactory manner.

## Cobalt Sourcing



Tesla continues to improve our supply chain due diligence program and efforts to conduct a country of origin inquiry with respect to our entire supply chain. These efforts are similar to our conflict minerals program and in line with the OECD Guidelines on Responsible Sourcing from Conflict Affected and High Risk Areas (“OECD Guidelines”). In addition to following our due diligence program requirements, all suppliers, sub-suppliers, and mining companies within Tesla’s supply chain are required to adhere to our Code, including taking a proactive approach to reducing environmental and resource impacts. All of our suppliers are also expected to follow our Code of Business Conduct and Ethics, including avoiding any activities related to corruption, conflict of interest, or money laundering.

In order to further increase the transparency of our cobalt supply chain, we collect detailed data from relevant suppliers using the Responsible Minerals Initiative’s (“RMI”) Cobalt Reporting Template. Because Tesla recognizes the higher risks of human rights issues within cobalt supply chains, particularly for child labor in the Democratic Republic of the Congo (“DRC”), we have made a significant effort to establish processes to remove these risks from our supply chain. We also recognize that mining conducted in a responsible and ethical manner is an important part of the economic and social well-being of those communities. We review all information provided by our suppliers for red flags and risks associated with ethical sourcing. Where we can be assured that minerals, including cobalt, are coming from mines that meet our social and environmental standards, we will continue to support sourcing from the DRC and other regions.

As Tesla expands our global manufacturing operations, our supply chain will continue to grow and become more complex. Regardless of this increased complexity, we continue to maintain high standards for our suppliers’ business practices. Tesla requires all of our battery cell suppliers and sub-suppliers to conduct annual third-party audits in accordance with the latest edition of OECD Guidelines and the commitments adopted by the RMI in their Cobalt Refiner Supply Chain Due Diligence Standard. Following results from conducted audits, we engage with our suppliers to implement audit recommendations as part of a process of continuous improvement of our supply chain.

## Cobalt Sourcing

Tesla's batteries use nickel-rich cathode materials which contain less cobalt than other widely used cathode chemistries in the industry, with our ultimate goal being to eliminate cobalt completely from our cells. For portions of our battery cell sourcing, we procure cobalt materials directly from producers that are verified as compliant with Tesla's Code. We work with participants along the value chain to shorten the supply chain by eliminating third-party cobalt refiners and by ensuring that Tesla's material is stored in clearly marked and segregated areas of the plant and is toll processed on dedicated lines for Tesla's production. For other parts of our supply chain where Tesla does not directly procure cobalt materials, cobalt may be sourced from many different countries, including the DRC. For material originating from the DRC, Tesla's battery cell supplier and sub-suppliers are required to purchase refined cobalt material exclusively from qualified conformant cobalt refiners as per the Responsible Minerals Assurance Process standards set forth by the RMI.

While Tesla's battery supply chain is the most significant portion of our cobalt sourcing activities, our supply chain due diligence efforts are not limited to these suppliers. We also engage with any suppliers that use cobalt in their part-material composition and work to collect additional information from them on the origin of these materials and their associated risk-reduction efforts. Tesla leverages the automotive industry's IMDS to best identify those of our automotive suppliers whose parts include cobalt. In addition, our energy production and storage business segment suppliers are asked to provide information on their cobalt sourcing, so we can apply the same standards to our Tesla Energy suppliers as we do for our automotive suppliers and sub-suppliers.

Tesla has also established dedicated internal resources to manage responsible sourcing efforts. Periodic reports on progress and identified risks are provided to Tesla's Responsible Minerals Steering Committee, which is comprised of stakeholders throughout the organization, and acted upon according to company targets and objectives.

Due to a combination of the positive outcome of these efforts and Tesla's direct engagement with our battery suppliers, we have mapped major areas of our cobalt supply chain. This transparency into the sourcing of cobalt for our supply chain allows us to better ensure it is done in an ethical and responsible manner. These results will continue to improve over time as we work with our suppliers and help them better align their internal processes for sourcing of cobalt to meet the same standards we hold ourselves to for this important area of our supply chain. Tesla has also started to engage directly with smelters and mines within our supply chain, both in and outside of the DRC. This additional engagement effort is part of a business decision to improve Tesla's supply chain transparency and minimize supply risk, as well as due to our involvement with the RMI's Smelter Engagement Team, a dedicated team that verifies and validates smelters around the world.

A woman in a black uniform and cap is using a power tool on a car engine in a factory. She is wearing safety glasses and gloves. The background shows other workers and machinery.

# People and Culture

## Introduction

We're on a mission to accelerate the world's transition to sustainable energy. Along the way, we're building a culture that is safe, fair, and inclusive for all of our employees. It is incredibly important to Tesla that everyone looks forward to coming to work every day. We are proud to have built a company filled with employees of all backgrounds who possess the energy and drive to accelerate our vision forward.



## Our EHS Strategy

### Becoming the Safest Car Factory in the World

Tesla makes the safest cars in the world and our goal is to have the safest car factories in the world. To achieve this goal, our Environmental, Health, and Safety (EHS) team continues to work closely with our employees and stakeholders to strengthen our environmental controls, minimize accidents, and improve our incident response. We continue to implement our strategy based on three pillars:

#### 1. Do the Basics Right

In 2019, Tesla created its first EHS Vision, Values, and Principles document in an effort to codify in writing the principles we have been operating by for years. This document was reviewed and signed-off on by our management team. For more details on our EHS Vision, Values, and Principles, please see the full document in the appendix of this report.

We also implemented a Stop Work global policy and conducted trainings for all of our production associates in order to ensure our employees have the tools and knowledge needed to identify issues before they occur. We also launched on-site medical clinics at Gigafactory Shanghai, Gigafactory Nevada, and our Fremont factory to provide on-premise healthcare services to our employees, in addition to implementing a Return to Work process that allows employees recovering from an injury or sickness to transition back to work in a safe and timely manner.

Furthermore, we continued strengthening our EHS management systems with ISO 14001 and ISO 45001 certifications for our Gigafactory Nevada and Gigafactory New York, further enhancing our ability to proactively manage environmental risk and prevent injury.

#### 2. Engage Our Stakeholders

Tesla kicked off our first ever Global EHS Week with the goal of meaningful engagement with our employees about the importance of safety in the workplace. Through various activities and seminars, employees were encouraged to explore why EHS matters to them, how it impacts their work, and provide leaders suggestions on how to further improve safety at Tesla. We have further bolstered our engagement efforts through OSHA Voluntary Protection Programs (VPPs) at several of our sites across California, Nevada, and New York. These efforts have resulted in a 35% year-over-year increase of employee engagements and meaningful redesigns of several processes, all of which has helped Tesla reduce injury rates.

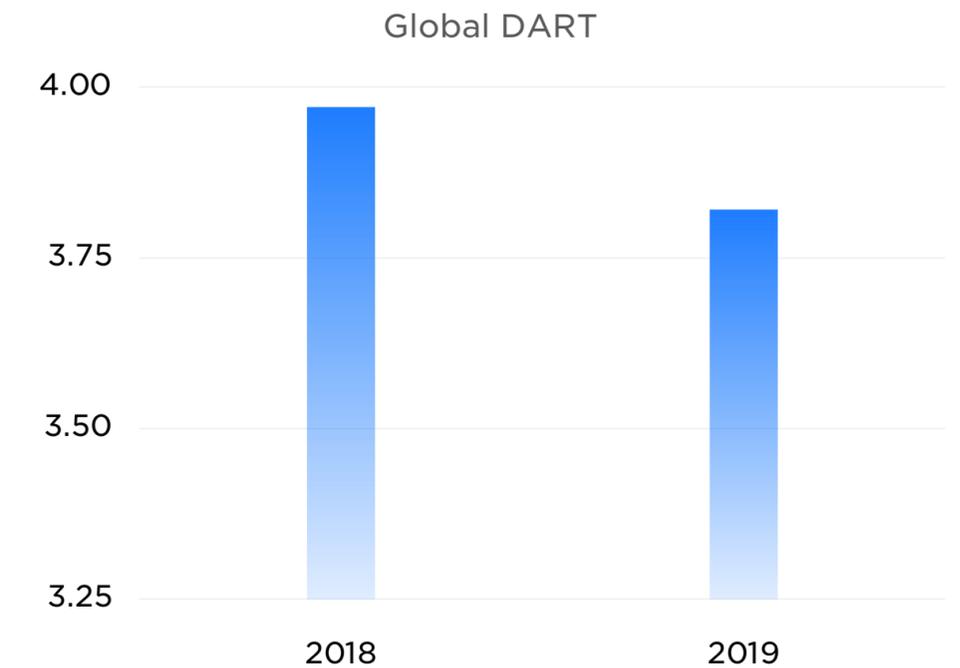
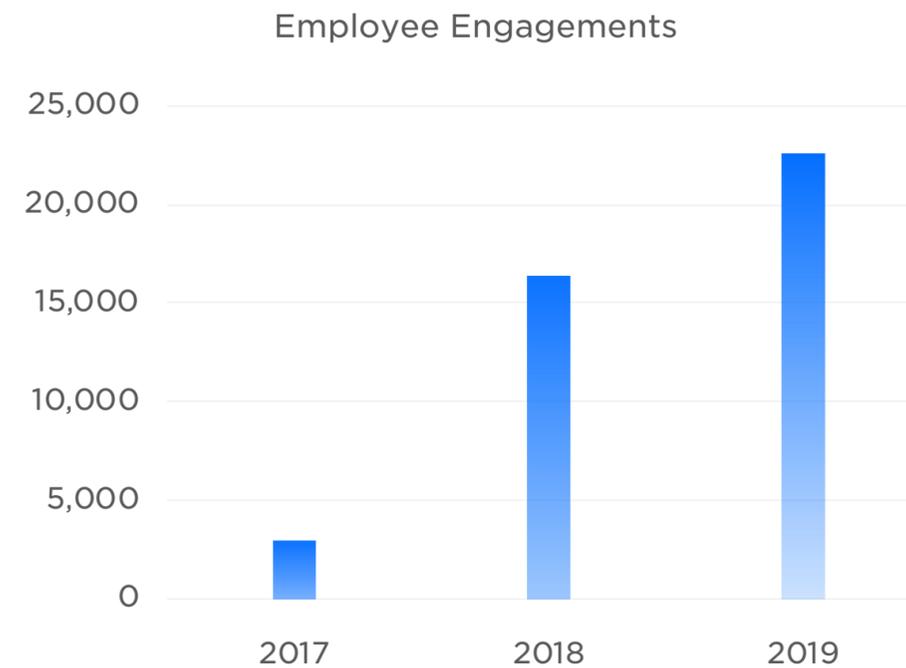
#### 3. Reduce Risk

Reducing risk of injury starts at the design phase of our facilities and our products. We continued to leverage that philosophy by using learnings from our Fremont, Nevada, and New York facilities to design and construct Gigafactory Shanghai in a manner that reduces the likelihood of workplace injury. We also used these same principles when designing Model Y: Ergonomics was a key driver of both product and production-line design. To further reduce the risk of injury at our facilities, Tesla implemented Life-Altering Injury and Fatality Elimination (LIFE) controls in addition to updating our Industrial Hygiene Exposure assessment for manufacturing.

## Safety Improvements

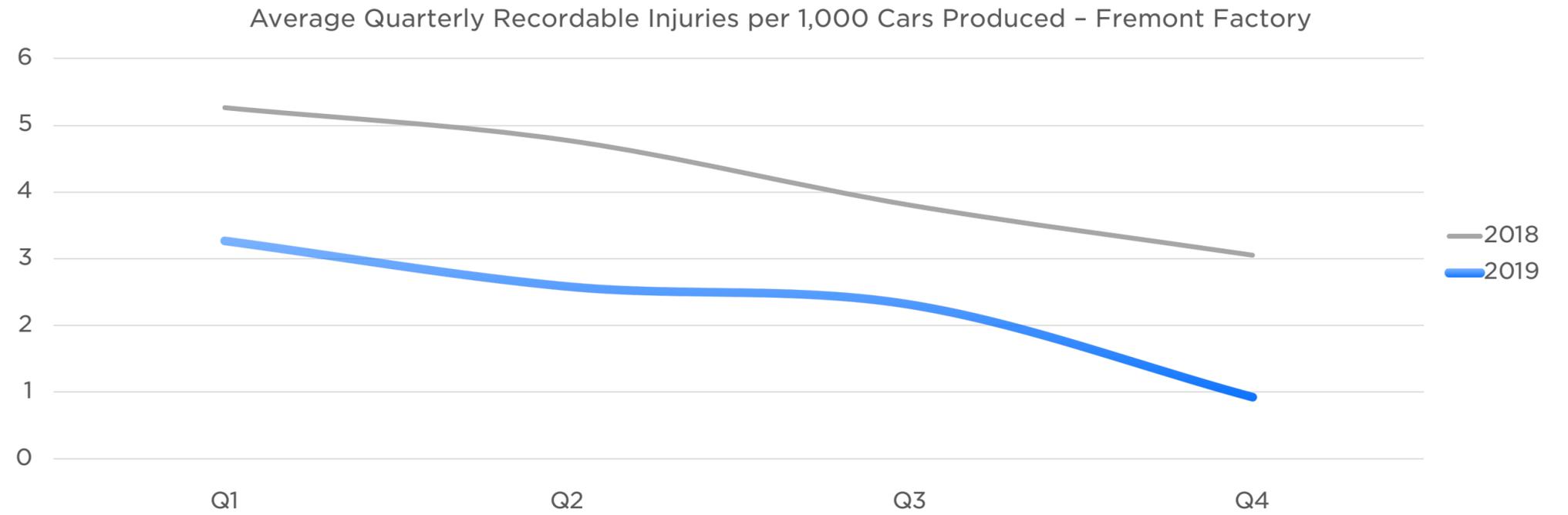
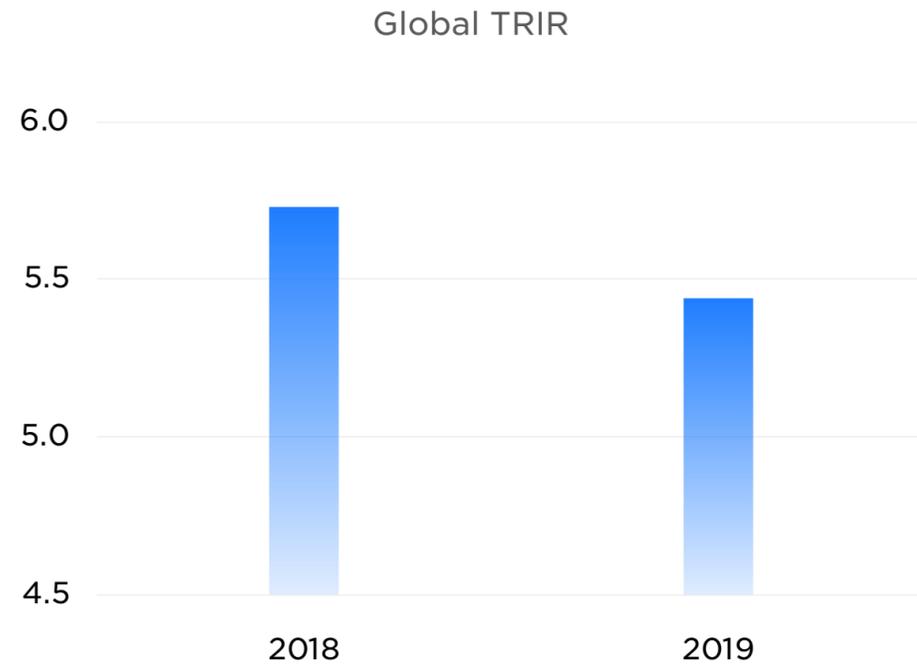
Our employee engagements, as measured by employee suggestions, good observations, our Find it-Fix it program, and continuous improvement ideas have increased year over year. The number of employee engagements grew from just under 3,000 engagements in 2017 to almost 23,000 in 2019. This is one of our most important metrics across our operations, as it fuels continuous improvements and is a catalyst for reducing injuries.

For progress made in 2018 related to Days Away, Restricted, or Transferred due to injury (DART) at our Lathrop Facility in California, Tesla was presented an Outstanding Award by the North American Die Casting Association in 2019. Companies with DART records equal to, or less than 2%, the national average for all manufacturing in 2018 are recognized as “Outstanding”. Our progress on safety continues with 2019 being one of the safest years yet at our Fremont factory: even as we produced significantly more vehicles our injury rates went down. Our Global DART rate improved 12% compared to 2018 and is at the industry average for large manufacturers. Associates spent less time away from work due to injury or illness. Our target is to continue to improve our Global DART even further in 2020 by 15% or more.



## Safety Improvements

Most importantly, for the three years ending 2019, Tesla employees had zero fatal injuries. Additionally, recordable injuries (as measured by injuries requiring medical treatment beyond first aid), restricted time, and lost time within our global manufacturing operations are trending downward year over year. Our Total Recordable Injury Rate (TRIR) for 2019 at the Fremont Factory of 5.98 is 5% better than Bureau of Labor Statistics industry average for auto manufacturers with >1000 employees. Compared to 2018, our rate of injury per vehicle produced was reduced by more than 50%. Tesla cares deeply about safety - both for our customers who enjoy our products and our employees who build them - and we will continue to work to make our products and our factories even safer in the future.



## Case Study: Ergonomics and Model Y Design

Tesla's Ergonomics team is an integral partner in the development of its latest and greatest vehicle designs. In 2019, the team worked to ensure that the design for manufacturing the Model Y included safety and ergonomics as a top priority in the vehicle's design. The processes followed were very similar to that of the Model 3 just a few years earlier; however, this time, the design and manufacturing engineering teams had an innovative approach to solve legacy issues experienced with the manufacturing of the Model S, X, and 3.

By designing what we have coined the "Supertub," a walk-in rear trunk cavity that is an industry first, directly into the body of the Model Y, production associates are able to maintain a neutral body posture while getting much closer to the work they are completing during general assembly of the vehicle.

The Supertub allows complete access into the rear of the trunk, giving our production associates unrestricted reach to install a number of parts, such as the subwoofer, Chargeport, seatbelt retractors, and trunk lid harness routing to name a few. This innovative design has improved the safety, efficiency, and quality of more than 20 different processes.

We are particularly proud of the support and collaboration shown by the design, engineering, and manufacturing teams throughout the process of creating the Supertub and designing the entire Model Y manufacturing line. Tesla's ergonomics team worked hand in hand with our engineering and design team from the beginning of the Model Y design process and helped to create ergonomic improvements to the design of the vehicle from the ground up.



## Rewarding The Individual

Tesla proudly offers a comprehensive range of benefits options to support our employees' health and well-being in every region of the world in which we operate. Our benefits allow our employees to choose the level of support that's right for them and their stage of life. We offer free medical, dental, and vision plan options and employer-paid life, disability, and employee assistance programs.

Additionally, most Tesla employees can buy Tesla stock at a discount through the employee stock purchase program.

We support our employees each and every day so that they can be at their best, both at home and at work. We also offer student loan consolidation services, confidential counseling, transportation subsidies, and tools and resources to support growing families.



## Culture of Diversity and Inclusion

## Forbes Best Employer For Diversity 2019

## HRC Corporate Equality Index

**100%** 5<sup>th</sup> year in a row

## Military Friendly Employer

3<sup>rd</sup> year in a row

### Tesla's Commitment to Diversity and Inclusion

At Tesla, we believe in having a diverse and inclusive workforce comprised of talented, driven, and authentic individuals. We value talented individuals at all experience and career levels who are passionate about and committed to our mission. We insist upon diversity and inclusion not just because it's the right thing to do, but because our differences enable us to have diverse teams that build the most innovative products changing the world today.

### Diversity and Inclusion Through Leadership Engagement & Employee Resource Groups

Our Diversity and Inclusion team along with our business leaders play an active role in bringing our commitment of diversity and inclusion to life inside Tesla through our recruiting practices, Employee Resource Group (ERG) support, and community engagement activities.

Engagement and activation begins with our Board of Directors where women represent 20% of the group's members. To commemorate Women's History Month in March 2019, the female members of our Board, led by Chairwoman Robyn Denholm, conducted a fireside chat with employees about their roles on the board and their unique experiences as top women in their fields.

Our ERGs are the driving force behind building grassroots communities inside Tesla. Their leaders volunteer their time outside of their day-to-day duties to build and support their communities. Our ERG leaders and members are responsible for planning and executing professional development, career development, and programming to engage their community throughout the year.



## Workforce Development

With over 48,000 team members in 2019 and a growing presence around the world, it is critical that Tesla accelerate global development of talent pipelines across high schools, community colleges, universities, and strategic communities of talent, such as transitioning military veterans to civilian careers. We know that team members who join Tesla from these pipelines are incredibly passionate about our mission, stay at Tesla longer, and accelerate their career faster. Through our targeted training and apprenticeship programs we are preparing students and professionals to fill critical roles at Tesla locations throughout the world:

**Manufacturing Development Program** is a two-year program where recent graduates from high schools surrounding our major manufacturing facilities in North America can start a career at Tesla as a Production Associate while continuing their education in automation and robotics at a neighboring community college. To date, we've placed over 100 high school graduates into this program since launching the initiative in 2017 at Gigafactory Nevada.

**Tesla Student Automotive Technical Program (START)** is an intensive training program designed to provide college students with the skills necessary for a successful career with Tesla in our service organization. We have partnered with six colleges across the country to integrate Tesla START into automotive technician curriculums as a 12-week capstone — providing students with a smooth transition from college to full-time employment, and we are continuing to add campuses to the program in 2020. To date, we've hired over 300 Service Technicians through this program and have seen a 90%+ placement rate each program cycle.

**Tesla's Tool & Die Apprenticeship** started at the Fremont Factory in 2017 arising from a need to produce local talent. The vehicle manufacturing industry faces a critical shortage of tool and die makers, with only 2% of the industry being under the age of 35. This 2-4 year program combines on-the-job training with relevant academic learning. To date, we have 15 team members in the apprenticeship with graduations expected in 2020, as well as expansion plans across multiple sites throughout the U.S.

**Tesla's Internship Program** is the most universal talent pipeline across Tesla, seeing over 1,200 undergraduate and graduate university students per year during fall, spring, and summer semesters across nearly every major area of the business. Tesla was recently selected by engineering students as the #2 most attractive employers. Interns at Tesla have the opportunity to work on a variety of projects to help advance the company's overall goals. Assignments are based on the company's current hiring needs, but most often include critical path projects and hands-on involvement, with an expectation for our students to perform at the same caliber of excellence as our regular employees.



## Community Engagement

We are focused on building programs that make a positive impact in the communities we live and work. By opening our doors for factory tour experiences, empowering teachers through new development opportunities, and partnering with local organizations that help inspire a brighter future, Tesla is continuing to establish partnerships to help drive this change.

### Teacher Externships

Teachers are the critical link to developing the next generation of talent in our communities. Building on a pilot program from 2018, Tesla started hosting high school teachers for multi-day externships to learn more about the career paths available at Tesla.

### Investing in K-12 Education

As part of Tesla's commitment to build Gigafactory Nevada, we established a five-year, \$37.5M investment fund focused on K-12 education that launched in June 2018. To date, we have established partnerships with 29 local and global entities to accelerate robotics and sustainability programming across Nevada.

### Factory Tour Program

Tesla continues to increase access for students, owners, and the community by providing workshops, educational activities, and event opportunities through our Factory Tour Program. At our factories in California and Nevada, we host nearly 40,000 visitors annually to gain insight into Tesla's mission and vision for a sustainable future.

### Introduce a Girl to Engineering Day

To help promote engineering careers to young women, Tesla hosted 200 middle school girls across eight locations for Introduce a Girl to Engineering Day, as part of National Engineers Week. At our facilities in California and Nevada, nearly 80 Tesla employees volunteered at the events, encouraging young female students to see technology as a means to pursue their future career interests.

### Secretary of the Navy Tour with Industry Fellowship Program

In 2019 we further strengthened our connection to the veterans community through a partnership with the Secretary of the Navy Tour With Industry Program. The program is a professional development program that places top performing U.S. Navy Sailors with leading companies for one year.



## Employee Mobility and Transportation Programs

To reduce our employees' carbon impact on the environment, Tesla offers alternative transportation programs to provide them with a more sustainable way of commuting. We continue to encourage ride sharing through a variety of carpooling services like our commuter shuttles and Scoop carpooling service, when safe and appropriate. We operate a network of commuter shuttles to and from work to reduce not only vehicle emissions, but also time spent in traffic too. In light of COVID-19, we have updated protocols for operating and riding on our shuttles, including provisions that ensure temperature checks prior to boarding, proper social distancing while onboard, and proper cleaning of shuttles in between trips. In the Bay Area in 2019, almost six thousand employees a day took shuttles to work, an increase from four thousand employees a day in 2018, lowering commuting costs for our employees. Naturally, Tesla also has hundreds of electric vehicle charging stations conveniently located at our facilities to encourage Tesla employees to go electric.

### EMISSIONS SAVED

**7,345,381**

Pounds of CO2 offset through our transportation programs in 2019

### DAILY RIDERSHIP

**6,000**

Bay Area daily shuttle ridership in 2019; an increase from 4,000 in 2018

### COMMUTES AVOIDED

**40,000**

Carpools by Tesla employees in 2019; 2x the number in 2018

## Corporate Governance Introduction

Our Board of Directors sets high standards for our employees, officers, and directors, and we periodically add new, highly qualified independent directors, such as Hiromichi Mizuno in 2020 and Larry Ellison and Kathleen Wilson-Thompson in 2018. We believe that sound corporate governance is critical to helping us achieve our goals. We are committed to establishing an operating framework that exercises appropriate oversight of responsibilities at all levels throughout the company and manages its affairs consistent with high principles of business ethics.

Tesla aspires to be a “do the right thing” company. Our Code of Business Conduct and Ethics sets out basic principles that should help anyone working at or for Tesla avoid even the appearance of improper behavior. Tesla’s Code of Business Conduct and Ethics and our Corporate Governance Guidelines are each available on Tesla’s website at:

<http://ir.tesla.com/corporate-governance/highlights>.

In addition, we believe in regular and transparent communication with employees. We encourage Tesla employees to share their feedback openly (and anonymously if they prefer), and the company provides easy methods to do so. We regularly conduct employee surveys to identify strengths and opportunities for improvement. We have a robust action planning process to ensure we proactively address the concerns or feedback.

We also have a whistleblower hotline through which employees can report concerns at any time. The company keeps information reported by employees in confidence, whether through the hotline or another channel. Our policies prohibit retaliatory actions against employees for raising concerns or making complaints. We are committed to maintaining an open and transparent culture where it is safe and acceptable for all employees to raise concerns about policy violations by their manager or colleagues or about the workplace overall.

## Corporate Governance

### Board Structure and Responsibilities

#### Tesla Board: a History of Engagement and Long-Term Focus

Tesla's mission to accelerate the world's transition to sustainable energy requires a Board willing to commit to long-term goals.

The Tesla Board has actively driven key decisions focused on achieving long-term growth and profitability, including decisions to:

- Manufacture and sell electric vehicles from the ground up rather than simply build powertrains for OEMs
- Establish Tesla-owned stores and service centers rather than use the franchised dealer system
- Create a global network of Superchargers to enable long-distance travel
- Build the world's largest battery factory to meet our needs and reduce battery costs
- Expand into energy generation (solar) and storage to create a vertically integrated sustainable energy company
- Compensate our CEO only if other shareholders realize tremendous value

The Board is directly and regularly engaged with senior management, and participates in robust shareholder outreach and feedback. Furthermore, Board members have significant experience as top-level executives at public companies or as entrepreneurs who founded successful organizations.

#### Committees of the Board

The Board has four standing committees—the Audit Committee, the Compensation Committee, the Nominating and Corporate Governance Committee, and the Disclosure Controls Committee—which are each further described in subsequent pages. Each committee member qualifies as an independent director under the listing standards of NASDAQ. In addition, as part of our governance review and succession planning, the Board (led by the Nominating and Corporate Governance Committee) evaluates our leadership structure to ensure that it remains the optimal structure for Tesla, reviews the composition, size and performance of the Board and its committees, evaluates individual Board members, and identifies and evaluates candidates for election or re-election to the Board.

#### Board Role in Risk Oversight

The Board is responsible for overseeing the major risks facing Tesla while management is responsible for assessing and mitigating Tesla's risks on a day-to-day basis. In addition, the Board has delegated oversight of certain categories of risk to its independent committees, which respectively report to the Board as appropriate on matters that involve specific areas of risk that each committee oversees.

## Corporate Governance

### Board Committees (as of June 1, 2020)

Name	Function	Year joined	Audit Committee	Compensation Committee	Disclosure Controls Committee	Nominating & Governance Committee
Robyn Denholm	Independent Board chair	2014	X	X	X	X
Elon Musk	Director and CEO	2004				
Ira Ehrenpreis	Independent director	2007		X		X
Larry Ellison	Independent director	2018				
Antonio J. Gracias	Independent director	2007	X			
Steve Jurvetson	Independent director	2009	X		X	
Hirromichi Mizuno	Independent director	2020	X			
James Murdoch	Independent director	2017	X		X	X
Kimbal Musk	Director	2004				
Kathleen Wilson-Thompson	Independent director	2018		X	X	X

#### Audit Committee

The Audit Committee is responsible for, among other things, overseeing Tesla's financial reporting and other significant financial matters, related legal and regulatory compliance, internal controls and Tesla's management of risks, data privacy and security. The committee carries out its duties in part through regular discussions with members of management across the Tesla organization and with Tesla's independent auditors.

#### Compensation Committee

The Compensation Committee is responsible for, among other things, overseeing Tesla's compensation policies, plans and benefit programs for Tesla's personnel including its executive officers and directors, and assessing risks related to compensation programs. The committee is also an administrator of Tesla's stock plans.

#### Nominating and Corporate Governance Committee

The Nominating and Corporate Governance Committee is responsible for, among other things, assisting the Board in identifying candidates for appointment and reelection to the Board, overseeing the evaluation of and periodic succession planning for Tesla's Board and management, and monitoring Tesla's corporate governance practices.

#### Disclosure Controls Committee

The Disclosure Controls Committee is responsible for, among other things, overseeing the controls and processes governing certain public disclosures by Tesla and its executive officers under applicable legal requirements.

## Driven by Sustainability

Sustainability is what drives us at Tesla, and it's not just about our products — it drives the values, manufacturing, and mission of our business. Sustainability is at the core of everything we do and what drives us in our work every day. To achieve a zero-emissions future, we've implemented several programs and initiatives at our manufacturing facilities and in the communities in which we operate, providing clean energy, partnering with local schools and nonprofits, and everything in between.

Tesla is a company comprised of sustainability ambassadors looking for ways to continue to set concrete sustainability goals and the paths we intend to take to achieve them, which we will continue to share in future Tesla Impact Reports.

We are proud of the work we have done thus far and look forward to sharing how our continued sustainability efforts make a difference in the world and accelerate its transition to sustainable energy.



## Appendix

### Our EHS Vision, Values, and Principles

**Tesla's mission** is to accelerate the world's transition to sustainable energy.

Tesla safely builds, services, and delivers all-electric vehicles, solar roofs, and infinitely scalable, clean energy generation and storage products.

#### Vision

Tesla's Environment, Health, & Safety (EHS) vision builds on the company's mission:

**Accelerating to a sustainable tomorrow while being safe, fair, and fun today.**

#### Values

Tesla's EHS values are simple and absolute:

- Do the right thing.
- EHS is a shared responsibility, and it starts with me.
- EHS is a part of everything we do.

#### Principles

Along with a shared Vision and Values, our EHS principles guide us every day. The most important principle is that we will not compromise EHS for production and profit. We know that EHS goals can conflict with production and profit goals and we deal with it head on. We make sure controls are in place and verified to keep our people and the environment safe. Our operations comply with Tesla's EHS policy and we follow these principles:

- Transparently report.
- Learn from incidents.
- Lead by example.
- Speak up.
- Practice innovative and quick problem solving.
- Comply with laws and regulations.
- Address issues using both risk-based and compliance-based thinking.
- Engage our stakeholders.
- Maintain a safe and healthy workplace.
- Always strive for continual improvements.
- Ensure measurable objectives.
- Conduct socially responsible decision-making.
- Focus on pollution prevention.
- Push to eliminate hazards and reduce EHS risks.
- Consult with and encourage participation from employees.

# Appendix

Metric / Disclosure	Source(s)	Methodology
Global Greenhouse Gas (GHG) Emissions by Economic Sector	World Resources Institute's World Greenhouse Gas Emissions: 2016	For simplicity, select categories were combined based on similarity of emissions source. For example, emissions from Manufacturing & Construction were combined with emissions from Industrial Processes under the label "Industry".
69 tons: Lifetime CO2 emitted by an average combustion engine vehicle (model year 2019) sold in the U.S. through its use phase, excluding CO2 emitted during the oil refining phase.	Tesla estimate based on the EPA 2019 Automotive Trends Report	Figure based on real-world (5-cycle) 25.5 MPG, which equates to 346gCO2/mi (model year 2019; source: EPA Automotive Trends Report), and 200,000 lifetime miles. Excludes CO2 emitted during oil refining and fuel transportation.
177 grams CO2e/mi of emissions for Toyota Prius	Tesla estimate based on data from OEM Website and Sphera Solutions*	Based on the 56 MPG EPA combined rating for the 2020 Toyota Prius L Eco, -2.3 kgCO2e/gal of gasoline from production and transportation of oil, -7.7 kgCO2e/gal of tailpipe emissions from gasoline, and -12% bio-fuel mix.
Manufacturing Phase Emissions for Average Mid-Size Premium ICE	Sphera Solutions*	<p>In order to estimate the cradle-to-gate carbon footprints (GWP100) of select benchmark vehicles, a simplified approach of multiplying their curb weights by a carbon intensity of -5.5 kg CO2e/kg was chosen. This reference value is based on a currently produced mid-size premium sedan that's comparable to the Model 3. The accuracy of this estimate for the other ICE vehicles directly depends on how their material compositions compared to that of the reference vehicle as well as on the existing variability of environmental impact profiles across different geographies and suppliers.</p> <p>As such, the specific carbon footprint (GWP100/kg) of the reference vehicle is only a proxy for the average premium mid-size ICE vehicle. Based on past work on automotive LCAs (Rohde-Brandenburger &amp; Koffler, 2019) (Koffler C. 873 , 2013) (Koffler C. , 2010) (Koffler C. , Krinke, Schebek, &amp; Buchgeister, 2008) (Koffler C. , 2007), the uncertainty of these estimates is estimated to be less than ±20% for a cradle-to-gate system boundary, and therefore less than ±5% once the use phase is added.</p> <p>The reference manufacturer's Environmental Certificates are calculated using the same BOM import functionality of the GaBi DfX software used for the Model 3 in the LCA authored by Sphera as well as GaBi 878 databases for all background data.</p> <p>Benchmark ICE vehicles include BMW 330i 2.0, Audi A4 2.0, Mercedes-Benz C300 2.0, Alfa Romeo Giulia 2.0, Volvo S60 2.0, Cadillac ATS 2.0, Lexus IS 300 2.0, and Infiniti Q50 2.0.</p>
Use Phase Emissions for Average Mid-Size Premium ICE	Consumer Reports, Sphera Solutions*	Figured based on owner-reported fuel economy to Consumer Reports. 23.6 MPG is representative of the average of model year 2019 Alfa Romeo Giulia, Audi A4, BMW 330i, Cadillac ATS (MY 2018; latest available figure), Infiniti Q50, Lexus IS 300, Mercedes-Benz C300, and Volvo S60. Use phase GWP100 of -420 gCO2e/mi includes gasoline production and distribution emissions from GaBi 2019 databases as well as consideration of bio-fuel mix of gasoline in the U.S.

# Appendix

Metric / Disclosure	Source(s)	Methodology
Manufacturing Phase Emissions for Model 3	Tesla, Sphera Solutions*	<p>Figure inclusive of: raw and semi-finished material production including transportation, mechanical processing and shaping, battery manufacturing, vehicle assembly and paint shop, all fuels and energy (natural gas, electricity, etc.), other auxiliaries (lubricants, water, etc.), and end-of-Life disposal. Figure exclusive of: capital goods (e.g., machinery, buildings), infrastructure (e.g. roads, power transmission systems), employee commute, external charging equipment and infrastructure, maintenance and service during use, packaging, transport to recycler, disposal of manufacturing waste, inbound transportation from Tier 1 suppliers, distribution to customers. Excluded activities are estimated to represent minor contributions to the cradle-to-gate as well as the overall LCA results.</p> <p>Where solar and storage are assumed to be a fuel source for the use phase of the Model 3, emissions were included in the manufacturing phase figure. The Model 3 Rideshare Use (solar charged) scenario is allocated 100% of these emissions on a per mile basis, while the Model 3 Personal Use (solar charged) scenario is allocated 82% of these emissions and 18% grid-charged emissions on a per mile basis (based on observed supercharging vs. other split).</p>
Use Phase Emissions for Model 3	Tesla, Sphera Solutions*	<p>Use phase emissions for grid charging are based on Model 3 delivery-weighted state-level grid mix based on DOE estimates of state-level grid carbon intensity (<a href="https://afdc.energy.gov/vehicles/electric_emissions.html">https://afdc.energy.gov/vehicles/electric_emissions.html</a>). Emissions of ~120 gCO<sub>2</sub>e/mi are a result of calculating the geographic distribution of the Model 3 in the U.S. based on Tesla's delivery data which weights state-level carbon intensity figures and assumes no change in grid mix into the future. This is a very conservative assumption based on recent new electricity generation capacity trends in the U.S. and commitments made by states to increase renewable mix on their respective grids.</p> <p>Real-world observed efficiency of Model 3 over 4+ billion miles, inclusive of energy losses from grid to battery, utilized for use phase emissions calculations.</p>
Energy Efficiency EPA range in miles/kWh	EPA, OEM data	<p>Figures based on estimated EPA range and usable battery capacity disclosures by OEMs for each model. Where EPA range did not exist WLTP was used to determine a theoretical EPA range based on average EPA to WLTP ranges for other EVs.</p>

## Appendix

Metric / Disclosure	Source(s)	Methodology
Water Consumption per Vehicle	Tesla	2018 / 2019: Water Consumed (million cubic meters/year): 1.33 / 1.04  Vehicles produced: 254,530 / 364,307 (excludes vehicle production in Shanghai in 2019)
Cumulative Energy Produced by Tesla Solar Panels vs. Consumed by Tesla Factories	Tesla, DOE, IEA	Figures for Tesla operated factories and supporting facilities in the U.S. based on actual electricity consumption from utility bills for 2018 and 2019. Panasonic operated facility in Japan estimated based on energy-intensity of Gigafactory Nevada per kWh of batteries produced in 2018 and 2019.  Figures for 2012-2017 are estimated based on 2018 and 2019 actuals scaled for vehicle and battery production for each respective year and facility.  Fossil fuel versus clean energy consumed at each facility for each year estimated based on state-level grid mix data from DOE for Tesla operated facilities in the U.S. and from country-level energy supply data from IEA for Panasonic operated facility in Japan.
EV Range and Utilization Over First Three Years of Ownership	RAC Foundation, ev-database.org	Figures based on annual mileage for select EV models in the U.K. for 2017-2019. Non-Tesla EV models include BMW i3, Kia Soul EV, Mercedes-Benz B250e, Nissan Leaf 30kWh, and Renault Zoe Q210. NEDC mileage for Model S 90 kWh and Model X 100 kWh.

\*All results are based on a life cycle assessment study currently under review by an independent expert and are subject to minor changes until the review has been finalized.

## Appendix

### Forward-Looking Statements

Certain statements in this report, including statements relating to future product development, performance and capability, expected cost savings from local manufacturing and materials recycling operations and the expansion of the Supercharger network, are forward-looking statements that are subject to risks and uncertainties. These forward-looking statements are based on management's current expectations. Various important factors could cause actual results to differ materially, including the risks identified in our U.S. Securities and Exchange Commission ("SEC") filings and reports, including the risks identified under the section captioned "Risk Factors" in our quarterly report on Form 10-Q filed with the SEC on April 30, 2020. Tesla disclaims any obligation to update any forward-looking statement contained in this report.

