

Tesla Motors

Disrupting the Auto Industry?

Introduction

Driving down the Silicon Valley corridor from San Francisco to the brown hills of Palo Alto near Stanford University, a casual observer might catch multiple sightings of the Model S, an all-electric vehicle made by Tesla Motors with a range of almost 300 miles. Although the company has many fans in the tech-friendly Valley, it also has its critics, who argue that Tesla loses money on each car sold. Indeed, with losses of \$290 million in 2014 and \$888 million in 2015, it's unclear if, or when, the company will eventually hit profitability. On the positive side, Tesla was ranked by Forbes as the World's Most Innovative Company in 2015, with a flashy feature on the front cover.¹ This was largely because of the success of its second model, the Model S, named Car of the Year by the magazine Motor Trend in 2013, the only unanimous choice anyone could remember.

Consumer Reports had given it the highest rating ever (99 out of 100) for overall performance. The car could do 0 to 60 miles per hour in just over three seconds (shaved to 2.7 seconds in "ludicrous mode," a feature launched that summer), was possibly the safest sedan ever built (protected in part by the battery packs that lined the chassis), required less maintenance than a combustion engine (no oil changes, spark plugs, filters, or hoses), and was beautifully designed with curved lines reminiscent of a Maserati or Jaguar. These characteristics combined to garner rave reviews from the media and owners alike.

However, for the car company trying to change the automotive industry, many roadblocks remained. For one, with a price tag of at least \$67,500, topping out at \$135,000 fully loaded, the Model S was affordable to only a small niche of wealthy owners. Although Tesla executives were pleased with the sales of the Model S, the roughly 20,000 units sold in 2014 represented less than 0.06 percent of the 16.5 million cars sold in the United States that year. Moreover, sales had been boosted by a government subsidy of at least \$7,500 per vehicle that could be taken away at any moment and was already scheduled to go away after the company sold 200,000 units.

Furthermore, Tesla was trying to succeed in one of the world's most difficult-to-enter industries, controlled by a few global players who struggled to squeeze out profitability. Perhaps most telling, the majority of drivers were skeptical about electric vehicles, afraid of getting stranded by a lack of recharging or repair stations. Just a few years earlier, Better Place, a start-up with almost \$1 billion in funding, had attempted to introduce electric vehicles in Israel, a smaller and well-defined market, with the backing of Renault and the Israeli government, but had been defeated by the immense costs of building an electric vehicle and the infrastructure to support it. Tesla seemed to be heading down the same path of trying to do it all: creating its own vehicles, charging stations, and a network of company-owned dealerships.

Experienced executives who had toured the Tesla factory whispered behind closed doors that the manufacturing line had major inefficiencies that signaled deeper problems in the production process. Could Tesla really manufacture high volumes efficiently enough to make the company profitable? *New York Times* columnist Joe Nocera voiced concerns about Tesla's

profitability, stating that the company “eats through cash, loses money on every sedan it sells, routinely overpromises what it will deliver to Wall Street and is regularly in need of new funding.”² Indeed, according to analysis by *The Wall Street Journal*, in the past five years, Tesla had fallen short on more than 20 projections made by company CEO Elon Musk, ranging from car-production output to financial targets.³

Against this backdrop of enthusiasm and skepticism, the company launched the Model X in fall 2015 with mixed results. The Model X was a \$100,000-plus SUV that could take seven passengers, with falcon-winged doors that opened vertically above the top (like the gull-wing doors of the iconic DeLorean sports car), designed to appeal to the same high-end niche of wealthy customers as the Model S. While the car itself received great reviews, Musk admitted that the Model X’s advanced technology (notably the falcon-winged doors) caused major delays and was “the most difficult car in the world to build.” On a grander scale, it planned to launch Model 3 in 2017, a four-door sedan with a starting price of \$35,000. The goal was to build an electric vehicle for the masses and to sell significant volumes—upwards of 500,000 per year—launching electric vehicles into the mainstream of cars in the United States. When Tesla unveiled the Model 3 in March 2016, the company had more than 300,000 customers plop down \$1,000 to “reserve” their Model 3 in the first week. The enthusiasm over the Model 3 suggested that that selling upwards of 500,000 per year was not just a pipe dream. But as of 2015 Tesla had not been able to produce more than 50,000 cars per year; so building 500,000 was far more than a “stretch” goal.

Tesla executives like to say they are on a mission to transform the automotive industry from one dominated by combustion engines that pollute the air with carbon emissions to one driven by electric vehicles using battery technology charged at Tesla’s solar-powered super charging stations. In short, they are out to disrupt and make combustion engine vehicles obsolete. The question is can they do it?

History of Tesla

In 2003, Martin Eberhard, a serial entrepreneur with concerns about global warming and US dependence on the Middle East for oil, decided to build a sports car that was environmentally friendly. He had noticed that many of the driveways of northern California had two cars that didn’t seem to go together—a Toyota Prius (which he called a “dork mobile”) and an expensive sports car. As he later explained, “It was clear that people weren’t buying a Prius to save money on gas—gas was selling close to inflation-adjusted all-time lows. They were buying them to make a statement about the environment.”⁴

After investigating a variety of alternative fuel options, Eberhard concluded that an electric-powered vehicle was the answer to provide the greatest efficiency and performance. During his investigation, he came into contact with Al Cocconi, founder of AC Propulsion (an electric vehicle firm) and one of the original engineers of GM’s ill-fated electric vehicle, the EV-1. AC Propulsion had produced an electric car called the tzero, that could go from 0-60 miles per hour in 4.1 seconds. Eberhard was impressed, but because the tzero used heavy lead-acid batteries, he felt that he could improve performance using lighter lithium-ion batteries, which were mass produced for electronics such as laptops. Said Marc Tarpenning, a Tesla co-founder and co-founder of an earlier venture with Eberhard:

“One of the things we kept running across was these articles that would say the reason why electric cars will never succeed is that battery technology has not improved in a hundred years. Literally, articles would say that, and it’s true of lead acid batteries. Yet it is not true of lithium-ion batteries. . . They get better, on average, at around 7% a year. . . It goes in fits and starts as they roll out new chemistries . . . They get cheaper and better.”⁵

After several failed attempts to talk AC Propulsion into producing the vehicles, Eberhard licensed the electric drive train technology from the company and teamed up with Tarpenning to found Tesla Motors.